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PART I.

ORIGINAL COMMUNICATIONS.

ART. I.—*Observations on Amputation of the Thigh and on the Merits of that Operation as Compared with Excision of the Knee.* By WILLIAM MAC CORMAC, M.A., M.D., F.R.C.S.I.; Member of the Senate of the Queen's University; Fellow of the Royal Medical and Chirurgical Society of London; Member of the Surgical Society of Ireland; of the Ulster Medical Society; and one of the Surgeons to the Belfast General Hospital.

FEW necessities, in many respects, are more painful than when amputation of the upper or lower extremity is required for disease of one of the articulations, whether it be of the thigh for disease of the knee, or of the arm for disease of the elbow. Sir William Fergusson, in his *Lectures on the Progress of Surgery*, styles amputation at once one of the meanest and greatest of operations. It is certainly, in the case of disease, a confession of failure—a rude, yet ready, and oftentimes effectual method of disposing of a difficulty we feel unable otherwise to surmount. Yet, as into the nature of many diseases we are confessedly unable to penetrate, as many are equally beyond the reach of our curative resources, and as injuries received, whether in war or in peace, seem only to increase

in severity as civilization is said to advance, surely under circumstances such as these amputation has been rightfully called one of the greatest of surgical operations.

Most fortunately, in the case of disease of the elbow, the beautiful mechanism of the hand and forearm is now but rarely sacrificed, excision of this joint having proved eminently successful. When it was proposed to save the foot and lower limb by a similar operation practised upon the knee when attacked by disease, it is not surprising that the proposal should have been joyfully hailed, and in many instances extensively and enthusiastically adopted. Now, as chronic disease is found in the knee perhaps more frequently than in any other joint in the body, and as the results of treatment, especially in hospital cases, are but too often the reverse of satisfactory, it is the more necessary that every alleged improvement should receive our most careful consideration.

Since the revival of excision of the knee by Sir William Fergusson in 1850, the operation has been practised a large number of times, and although the materials are perhaps now available wherewith to form a tolerably correct estimate of its value, there is almost no established surgical procedure regarding which such wide differences of opinion exist, or about which controversy has more hotly raged.

No one will be disposed to deny that to preserve a strong and useful limb, firmly anchylosed at the joint, at an equal risk to life, is in every respect more praiseworthy and more surgical than to lop it off with the knife, and that where its preservation is practicable, to amputate would be an opprobrium of surgery. Nevertheless, as I conceive it to be our paramount duty to endeavour to preserve human life as well as limb, it becomes obligatory upon the surgeon to inquire not only into the abstract merits of every novel procedure, but very carefully into the effects it may have as to safety or otherwise. To this consideration I think every other should be forced to yield, and it is in the hope of adding something, however trifling, to the common fund of information, that I have ventured to place before the readers of this journal some observations on the question of amputation of the thigh, more especially in reference to excision of the knee-joint.

The idea was partly suggested by the history of a case of disease of the knee in a young girl, whose limb I was extremely unwilling to sacrifice. She was a pretty, delicate creature, only eighteen years of age, very thin, and very anxious-looking. She was first

admitted to hospital, under my care, with simple synovitis of the right knee, in March, 1866, but had for several years been complaining from time to time of pain and uneasiness in the joint. After a month's treatment she was discharged relieved, only to be re-admitted a month afterwards. By appropriate means, and the opening of an abscess over the inner tuberosity of the tibia, she was again enabled to return home somewhat improved in health. At the end of September she sought admission a third time in much worse condition than before. A sinus leading to diseased bone existed where the abscess had been opened, and another had formed in the popliteal space. After trying various means without avail, an exploratory incision, cutting down upon the inner tuberosity of the tibia, was made, and a large quantity of carious bone gouged out. I hoped that the disease was subarticular caries, confined to this position, and the result for a time justified the expectation. The pain, which previously had been almost excruciating and incessant, wearing the poor girl down, and causing her to implore relief, was completely removed, and she recovered so far as to return to her employment, and to obtain complete remission of all suffering for two or three months. Half a year later, on April 30, 1867, she came again to hospital. For the last few months the disease had been progressing rapidly, and she was suffering great pain and spending sleepless nights. The disease, which formerly appeared confined to the upper extremity of the tibia, now evidently implicated the lower end of the femur, which had become inflamed, and was covered with thickened periosteum for three inches up. The sinuses were unhealed and discharging ichorous pus. There was very little effusion into the joint, and not much into the tissues around it. Careful examination of the lungs failed to detect any marked disease, although the respiratory murmur was somewhat roughened. This case would not longer brook delay, and the question was whether to excise the joint or to amputate. The poor girl herself was most anxious that her leg, which was a shapely one, should not be sacrificed, and so I was myself, but I was constrained to adopt the latter mode, as I felt that her shattered constitution and wasted frame would not withstand the drain of such an operation as resection, even if she escaped its more immediate consequences. And here I would enter a protest against allowing the patient himself to decide such momentous questions. It is the business of the surgeon to do so, and he should not shirk his responsibility by trying to shift it to the

shoulders of another, whose state of health and ignorance of the subject, so totally unfit him from arriving at a just conclusion.

On the 3rd May, after consultation with my colleagues, the patient was brought down to the theatre, submitted to the influence of chloroform, and the following operation performed. The point of the femur selected for division was just at the termination of the thickened and inflamed periosteum. An anterior oval flap, extending to the upper margin of the patella, was formed by cutting from without inwards, and including most of the soft parts on the front of the thigh. The flap at its base equalled half the circumference of the limb. A short posterior flap was then made by transfixing the limb. Both flaps having been retracted, a circular sweep of the knife was made at the point where the femur was to be sawn, and the bone carefully divided. The main vessel, and six smaller arteries having been secured, it was found that not an ounce of blood had been lost. Six sutures brought the edges of the wound into accurate and easy apposition. Some strips of moistened lint, secured by a few turns of a bandage, were the only dressing.

On examination of the joint after removal, the disease was ascertained to be more extensive than had been supposed. The soft tissues were infiltrated with gelatinous material, the cartilages of incrustation removed, except a small patch over the external condyle, and on the external articulating surface of the tibia. The periosteum peeled easily off the femur up to one inch of the point of section. The cancellated structure of both tibia and femur was much degenerated and infiltrated with oily matter. Four inches of bone, at least, would have required removal before comparatively healthy surfaces of the femur and tibia could have been reached, and even with that the gouge would have proved needful.

Respecting the after progress of the case, nothing could have been more satisfactory. In twelve days the girl was convalescent, and in my note-book I find that on the 18th May, fifteen days after operation, it is reported that she can bear firm pressure on the face of the stump without wincing, and that she was ordered to go out of doors to breath the open air in the hospital grounds for some hours daily. Her appetite is good. She sleeps well, and has no pain whatever. On June 4th she was able to bear the firmest pressure on the end of the stump without pain. The line of cicatrix is quite behind the bone, and out of reach of any pressure applied to the face of the stump. She was discharged on the 8th June, having been retained in hospital longer than was necessary,

in order to exhibit the stump to the students. She was then reported as being in first-rate condition and in good spirits, having been a little over one month under treatment.

The lithograph illustrating this paper is drawn from a photograph taken upwards of a year after operation. The girl has grown quite fat, enjoys excellent health, and, considering her former position, has made a remarkable recovery. She has been for some time anxious to wear an artificial limb, but the circumstances of her friends render it difficult for her to obtain one. The stump is plump, the end of the bone is covered with a thick, movable cushion, against which the patient suffers to be made, without inconvenience, almost any amount of pressure.

Now, in the case of this girl I tried time after time all the means within my reach calculated to aid nature to restore the diseased joint and impaired constitution to health. At one time I almost believed I had completely succeeded. The disease, however, returned and progressed, and, just before her last admission to hospital, so rapidly, as to show that no further time could be lost without destroying the patient's chances of life. Up till the last moment I was most anxious to have performed resection of the joint, but at the eleventh hour I had to abandon all idea of it. I became convinced, and it was also the unanimous opinion of my colleagues, that the girl would in all probability never survive the operation of excision. That she made a good recovery after her limb was amputated is abundantly clear. The history and termination of this case recal very forcibly the particulars of the last one, in which excision of the knee was performed in the Belfast Hospital. The patient was a well-nourished girl of eighteen. The knee had been the seat of chronic disease for five years. Apparently it was not extensive, and was confined chiefly to the end of the bones. There were no sinuses or collections of matter, and there was no visceral disease. Altogether the case seemed a most favourable one. After the operation, the shock and prostration which ensued, and continued a long time, were frightful. I have seldom seen greater, and in sixteen days she was dead from pyemia. The H-shaped incision was employed, and the transverse wound healed; but I have often seen this healing, in the first instance, of wounds in cases which afterwards turned out unfavourably. I have now performed amputation of the thigh for disease of the knee-joint several times after the manner before described, and have good reason to be satisfied with the results.

The operation is essentially similar in principle to that proposed by Mr. Teale, over which it possesses considerable advantages, without the imperfections which are unavoidable with the rectangular flaps. The profession were much struck with the advantages claimed for Mr. Teale's method of amputation, which was first, I believe, applied to operations on the thigh, and afterwards more extensively employed—and in the August number of this Journal for 1866 Mr. Croly enthusiastically advocates its superiority over other methods.

To me it has always appeared that the inordinate length of bone often necessarily sacrificed in order to fashion the flaps according to the prescribed rule was an objection which, if not insurmountable, counterbalanced, at least to a large extent, the advantages which might otherwise accrue. If any one will map out on a moderately muscular thigh the flaps necessary to amputate by Mr. Teale's directions, the anterior being made to go as far as the upper border of the patella, he will be amazed, if he have not previously made the experiment, to see how far up the limb the bone must be sawn through. Indeed Mr. Teale admitted the force of this objection, and recommended that in a muscular limb the long flap should not be made so extensive, and that in amputations near the knee the flap should be dissected from the front of the leg, over the patella. It is not difficult to imagine several conditions, both of disease and accident, in which these suggestions would prove impracticable. It becomes, therefore, an important question, says Mr. Lister, in Holme's *System of Surgery*, whether the advantages of Mr. Teale's method may not be obtained in some less objectionable manner. Sédillot recommends a single, long anterior oval flap, and a transverse division of the posterior parts, which would involve a division of the bone nearly as high as in the rectangular, and the operation recommended by Mr. Spence is almost precisely similar. The operation I am in the habit of performing has the addition of a shorter posterior flap, which may be made to vary in length according to circumstances, but should not exceed half the length of the anterior one. Mr. Lister is much in favour of this form of amputation, and it seems to combine, with all the advantages, none of the disadvantages, of the method by rectangular flaps. No bone need be unnecessarily sacrificed, and as each inch of the femur adds, when divided higher up towards the trunk, about five per cent. to the rate of mortality, this is a matter of some importance. There is also a relatively smaller cut surface exposed than in Teale's operation. The flaps admit of exact coaptation, and the line of

junction is at the most dependent part, but not underneath the stump, as in Teale's, where it must be subjected to pressure. There seems to be no tendency to protrusion of bone or to conical stump, which, from whatever cause, is not infrequent after amputation of the thigh, while the end of the bone is covered with a thick cushion very different from the thin tender skin which so often covers the end of a stump after the circular operation.

It is hardly necessary to detail the steps of the operation; the anterior flaps should be fashioned by a bold sweep of the knife right down to, or partially through the superficial muscles, which should be then rapidly dissected up. The posterior flap containing the large vessels and nerves is formed by transfixion, and by retracting the flaps, and sweeping the knife around the bone, it can be divided, if necessary, much higher than the base of the flap. Mr. Luke recommends an operation just the converse of the one described, with the important exception that the flaps are equal in length. He first transfixes the posterior flap, and then dissects up the anterior. I am at a loss to see any advantage in this order of proceeding, and it is manifestly undesirable to divide the great vessels in the first incision, besides the extreme likelihood of splitting them or cutting them very obliquely. The after treatment I employ is always of the simplest kind. After the sutures are inserted, a few pieces of lint, wet in carbolic acid lotion, are passed over the face of the stump, and kept moist. I have never found any advantage from the application of the acid, either strong or diluted, to the cut surfaces, but rather the reverse. It is my constant practice to give such nourishing food as the patient can assimilate, from the very first. Of course general hygienic as well as moral influences should be always rigorously attended to.

In the very last case in which I operated, for very severe old-standing disease of the knee, intermediary hemorrhage occurred, the stump filled with blood, required to be opened, and have the clots removed; oozing, however, continued, apparently from the entire surface of the flaps, or *a l'eponge*, and it was not until after iced water had trickled over them for some twenty-four hours that the bleeding was arrested. During this time the unopposed muscles retracted to a large extent, and it required very careful dressing for many days before the edges of the wound were again brought in contact, although the flaps seemed originally most ample. In spite of this untoward accident the patient recovered rapidly, being up and about in sixteen days. I have preserved,

in a photograph, the appearances of the excellent stump which resulted. It is as good, if not better, than the one represented in the plate. I think it is extremely probable that protrusion of the femur would have resulted in this case, had the ordinary circular operation been selected.

I cannot agree with Mr. Lister in thinking that the skin should be dissected from the muscles when forming the posterior flap. It is a tedious and unnecessary complication of an operation, otherwise extremely simple, and capable of being performed with great rapidity. The retraction of the posterior muscles, which this modification is meant to counteract, is a gradual process, and I have never seen it excessive, while, if the anterior flap be sufficiently ample and well formed, this retraction proves of ultimate advantage by drawing the line of cicatrix further back.

On looking over the published accounts and statistical tables of amputations, and the mortality after various operations, one cannot fail to be surprised at the enormous discrepancy between the statements of different authors. Of no operation can this be said with, perhaps, greater force than of amputation of the thigh. We find Mr. Syme alleging the average mortality to be not less than from 50 to 70 per cent., according to the stern evidence of hospital statistics. M. Legouest has collected 2,274 cases from various sources, amongst which there was a mortality per cent. of 84·79. In the French army in the Crimea the mortality was 91·90, in the English it was 65·20, while in the late American war it was 64·43. In civil practice it is, of course, much less, being 41·6 according to Mr. Lane's statistics, and the records of the New York and Pennsylvania hospitals give an estimate, almost equal, of 41·4. With such various amounts, one is inclined to agree with Gross when he states "that the mortality after operations is influenced by so many extraneous and intrinsic influences, that it is extremely difficult, if not impossible, in the existing state of science, to arrive at any satisfactory conclusions respecting it."

No doubt much confusion is attributable to the manner in which statistics are in many instances compiled, no discrimination being made between amputations for disease and injury; no allowance granted for the age and sex of the patient; and, what is of the last importance, no stress laid upon the part of the limb at which the operation has been practised. Now it is well ascertained that amputation performed for disease is vastly less fatal than when necessitated by injury; that amputation is less fatal in women than

in men; that amputation, even of the thigh, is rarely fatal in young children, and that the proximity of the incisions to the trunk has an enormous influence on the death-rate.

Now, the amount of mortality after amputation of the thigh is of especial importance, being an essential consideration when estimating the value of excision of the knee-joint. I think it may be assumed that the relative desirability of, and danger to life in, these two operations are still matters somewhat warmly disputed. For while Sir William Fergusson, Mr. Butcher, Mr. Henry Smith, and the late Mr. Price have contended that the dangers of the operation of excision of the joint are even less than those apt to occur after amputation through the thigh, other distinguished surgeons may be cited who entertain very different opinions. If I interpret them aright, Mr. Syme, Mr. Coote, Mr. Timothy Holmes, Dr. Hodges, of Boston, and others, esteem excision as not only more dangerous to life, but as presenting advantages which must often be considered highly problematical, or attainable only at immense cost. To endeavour to place the facts in a manner which may tend in any way to determine this vexed question cannot be regarded as without importance.

In the first place we should be mindful to institute a fair comparison, and not to contrast, for example, excisions of the knee for disease, as they almost exclusively are, with amputation of the thigh, whether performed for disease or injury. Amputation for injury should be compared with excision for injury, and amputation for chronic disease, and for disease of the knee-joint in particular, is the only fit subject with which to contrast excision of that articulation when diseased.

To form a just conclusion respecting the mortality after the excision of the knee for injury, there is hardly sufficient material. Eleven cases are recorded in circular No. 6, by the Surgeon-General of the United States army, where resection had been performed for gunshot wounds. Of these nine died, and as of one of the recoveries it is stated in the circular that "the success claimed is so extraordinary as to suggest some doubts of its authenticity," we may fairly exclude it from our consideration. Indeed the published account of this case bears internal evidence of the justice of the Surgeon-General's remark. In a paper recently published in the *Archives Générales de Médecine*, M. Spillmann has collected particulars of twenty-one cases where resection of the knee has been resorted to in military surgery, and nineteen times a fatal result is said to have

ensued. This does not include the Alumbaugh case in 1858, when a native soldier had his right knee excised, and the left thigh amputated at the same time. As might be expected, he never rallied from the shock.

This is, without doubt, a frightful amount of mortality, and the conclusion M. Spillmann arrives at few will be disposed to dispute. He says, that "Toutes les illusions doivent tomber devant une pareille expérience. La résection ne peut s'appliquer à la chirurgie d'armée, si ce n'est dans des conditions très exceptionnelles." Military surgery, however, affords no fair criterion of the fatality of the operation in itself. The exigencies of the field of battle and of the camp, afford but little opportunity for that careful after-treatment and repose so necessary to ensure success; and the injuries inflicted by modern projectiles are so severe and extensive, especially of the bones, that it is difficult to ascertain the actual extent of the damage previous to operation. In civil practice, when the operation has proved necessary for injury, the results, so far, have been very encouraging. M. Spillmann has given details of thirteen cases with only three deaths. One of the fatal cases, that of Mr. Hutchinson, being from tetanus—the patient at the time was progressing favourably.

In some of the instances referred to, the majority of which were young subjects, the operation was performed at short periods after the accident, when inflammation had set in, and under circumstances that would have rendered amputation probably, if not certainly, fatal. Although the cases prove few in number, the results are striking, and should certainly encourage us to attempt the preservation of limbs by resection of the knee, which by gunshot or other injuries of the articulation, would otherwise have been certainly condemned to amputation.

The question, however, of the desirability of excision of the knee for disease of the joint, is of much greater importance, owing to the comparative frequency with which it has been lately practised. I do not mean to advert to this method of treatment as applied to cases of deformity of the lower limb, the consequence of previous disease, further than to say, that I think our experience, although somewhat limited, distinctly forbids our performing the operation as one of expediency in persons in health. Dr. Hodges tabulates nineteen cases, of which eight died, the fatal termination being, in each case, more or less directly due to the operation itself. I have to thank Mr. Bryant for informing me of a case in which he recently

removed a wedge of bone for synostosis of the articulation at a right angle. Death took place from pyemia. Twenty cases, and nine deaths, only affords one more example of the fatality which seems invariably to attend *operations de complaisance.*

Mr. Butcher, an ardent advocate of excision, quotes in his work on "Operative and Conservative Surgery" some very limited tables of amputations of the thigh, namely, 19 cases of injury, and 34 of disease, from Mr. Erichsen, with a mortality, respectively, of 58 and 20·5 per cent.; and from Malgaigne's statistics of the Parisian hospitals, 46 cases of injury and 143 of disease, the mortality per cent. being in the first 75, and in the latter, 60 per cent. From these statistics he draws the following conclusions, that "these tables, when contrasted with my second upon excision of the joint, set at rest for ever the question of the comparative danger of the two operations. In these we have forcibly demonstrated that *the danger of excision is considerably less than that attending amputation of the thigh.*" The italics are Mr. Butcher's; who further adds, that "the wound necessary for the removal of the diseased bones is less extensive than that attending amputation of the thigh, whether performed by the circular or the flap operation." It is a matter of small consequence, except so far as it affects the life of the patient, and the results of the operation, which wound is the larger. To me, however, it would appear that the extent of wounded surface exposed during excision must be fully as large, if not larger, than when a limb of equal size is amputated in the lower third. Regarding Mr. Butcher's first assertion, that the question of the comparative danger of the two operations is "set at rest for ever," I must, with every respect for that eminent surgeon's experience, entertain a different opinion. The conclusion is based on only 31 cases, of which it appears that 5 died. The number is far too small from which to make so sweeping a statement. Besides, to show how readily error may inadvertently creep, even into the most carefully prepared statistics, I may mention that in one of the cases, that of the late Dr. Stewart, of the Belfast Hospital, which is quoted in the table as "encouraging," a fatal result ensued in a few weeks. This would give a mortality of 19·35 in the 31 excisions, or only 1 per cent. less than the mortality of amputation of the thigh for disease, as given by Mr. Erichsen. This is rather too small a margin. I do not compare this result with Malgaigne's statistics, since excision of the knee is an operation, to a large extent repudiated by French surgeons, many of whom have

denounced it in strong language, and I am unaware of any statistics of excision as practised in Parisian hospitals. Mr. Butcher gives two other tables; one comprising operations of excisions from 1762 to 1849, 31 in number, with 17 deaths; his last table contains 51 cases and 10 deaths, being down to December, 1856. Of these, however, a good many are simply recorded as "recovering," so that for statistical purposes they are not of much value, and to the first category of cases Mr. Butcher deprecates any allusion. It is assumed, and perhaps correctly, that imperfections in the methods of selection, of operation, and of after-treatment, were the causes of the excessive mortality in the earlier history of the operation. I think we may, with justice, set against these objections the certain fact that a considerable number of patients who have had their knees excised in recent times, have died, and have had nothing more said about them. In all then, we have, in Mr. Butcher's work, a total of 113 cases, with 33 deaths, from one cause or other, a mortality of 29·20 per cent. One or two cases in the first table were for injury, but all the rest were for disease.

Since Mr. Butcher wrote, tables, much more ample and satisfactory, have been compiled, and the means of arriving at a more correct estimate, though still, perhaps, inadequate, are forthcoming.

Perhaps the most complete have been those of Dr. Oscar Heyfelder, of St. Petersburg, and Dr. Richard Hodges, of Boston, published in 1861. The former writer gives the aggregate results of 2,241 cases of excision of bones and joints. The number given of the knee is 213, with 64 deaths and 129 recoveries, being a mortality of 30·04 per cent. Dr. Hodges' monograph is both able and interesting, and he deals with the entire question of excision of joints in a truly scientific spirit. He gives, amongst other tables, one of all the excisions undertaken since 1850 for chronic disease of the knee alone. He acknowledges his indebtedness to Mr. Butcher for 65, and to Heyfelder for 35 of the cases, which amount to 208 in number. Of the whole number, 106 recovered, 60 proved fatal, and 42 patients underwent subsequent amputation. This gives a mortality of 28·84 per cent., chiefly from pyemia and exhaustion. These last figures probably give a tolerably fair and exact estimate of the fatality attending excision of the knee for disease, with all the advantages which modern skill and experience have suggested, and these consist in little else than enforcing rest by suitable means, and interfering as little as possible with the wounded limb. We have, of course, to take account of

those cases which underwent amputation subsequently, implying a failure of the original operation, and which amount in the table to more than 20 per cent. of the cases.

Excluding the earlier cases, up to 1850, recorded in the tables of the late Mr. Price, out of which more than half died, there appear in that surgeon's interesting monograph, some 240 cases of excision performed by British surgeons for disease and deformity, and 53 additional ones are mentioned by Mr. H. Smith, in a note, with a total, when taken together, of 67 deaths, or 22·86 per cent. In 44, however, amputation was subsequently performed. Mr. Price has also given a table of 15 cases operated on by Dr. Heusser, of Zurich; of these 8 recovered and 6 died from the effects of the operation, while one died after amputation. With regard to some more recent cases I have been able to collect from different sources, I find that in King's College Hospital Mr. Smith mentions there have been 53 operations up to 1865, with the considerable mortality of 17, or upwards of 32 per cent. In the Glasgow Infirmary there appear to have been 16 cases, of which 7 died from the operation, and 2 more after amputation, which had to be performed in three instances. Dr. P. H. Watson has recently published an interesting account of 12 cases in which he had himself occasion to excise the knee, six of them proving fatal. In the Belfast General Hospital the operation has only been performed six times; in five instances a fatal result ensued, while one recovered after amputation. In the London Hospital Mr. Curling informs me the operation is not much in vogue. During the last four years resection of the knee has been only twice performed—one case recovered and one died. In Guy's, Mr. Bryant writes to me to say that, so far as he can learn, excision of the knee for disease has only been three times performed. All three failed as cases of excision, and amputation was subsequently practised—one of the patients dying.

Through the courtesy of Mr. Holmes I possess the particulars of seventeen cases of excision performed in St. George's Hospital since 1863. One of them is still under treatment, and is likely, Mr. Holmes states, to prove fatal. It may therefore be left to one side. Of the remainder four died, and one was subjected to re-excision, but with what result is not stated. Twelve of the patients were under fifteen years of age, the youngest being only four—a circumstance favourable to successful excision. In the Royal Infirmary of Bristol there have been since 1860 six cases of excision. All of them recovered, but in three instances amputation proved

necessary. Mr. Crosby Leonard, through whose kindness I obtained the information, does not mention what amount of usefulness was attained by the limb in the three successful cases.

In St. Thomas's Hospital the practice of Mr. Le Gros Clark has been attended with striking success. He has operated a dozen times. In only one instance, that of a strumous child, was the operation primarily fatal. The patient never rallied afterwards. In a young woman of eighteen, excision proved successful in the first instance, as firm osseous union took place between the opposed ends of the tibia and femur. The patient went to the sea-side, but returned to the hospital with recurrent caries, and rapidly declining health, compelling Mr. Clark to amputate fifteen months after the first operation. In the letter this surgeon has favoured me with, he states, that with these two exceptions, all his cases have recovered, some with excellent limbs and scarcely perceptible lameness, others with firm but less sightly limbs. The period of recovery has varied considerably. He further adds:—"I think there is no doubt that early interference by operation favours success, but I am also satisfied that protracted rest will cure many cases where excision might get the credit if performed."

Adding these cases together, which have been collected without distinction from such sources as were available to me, we have an aggregate of 126 hospital cases, Dr. Watson's being, with one exception, operated on either in Chalmers's Hospital or the Royal Infirmary of Edinburgh, and of these 41 died from the operation, or 32·45 per cent., while 12 of the limbs were afterwards amputated, and of these 4 died. It should be mentioned that one of Dr. Watson's excisions was for injury.

In striking contrast to this high rate of mortality, is the extraordinary success attending the practice of some surgeons. Mr. Butcher has been successful in each of his six cases. Mr. Jones, of Jersey, had at one time nineteen excisions of the knee, with only one death; and although Mr. Humphrey, of Cambridge, has had but six deaths in thirty-two cases, he has found it necessary to amputate on eight occasions.

The determination of the amount of fatality after amputation is fortunately not surrounded by difficulties at all so great as those found in respect of excision. Extensive tables, bearing on the question, have been published from time to time, chiefly extracted from hospital records, and although they vary in some instances immensely, an analysis, carefully made, will detect the causes in

some local circumstances, or in the manner they have been compiled. Mr. Lane's statistics, published in Cooper's Dictionary, gives 641 cases of injuries requiring amputation, with a mortality of 57 per cent. In the Glasgow Infirmary, and in the Belfast General Hospital, it has been the same, amounting to 50 per cent.; whilst, as previously cited, it varies in war, from 64 in the American army, to 91·90 in the French during the Eastern campaign.

It is, however, with the mortality in operations performed for disease that we have now to deal. Mr. Lane's tables give 705 cases, with a percentage of 27·23 deaths. In some statistics published a few years back in the *Medical Times and Gazette*, the amputations of the thigh and leg, in the London and provincial hospitals, during a period of three years, are tabulated. Of the former 303 cases are recorded in which the operation had been practised for disease, with 71 deaths, or 23·40 per cent. I have searched the register of our own hospital carefully for many years past, and find the fatality after amputation of the thigh, for disease generally, amounts to 32·35 per cent.

We know, however, that, irrespective of injury, disease of the knee-joint forms by far the most frequent cause of amputation of the thigh, and it becomes important to ascertain the percentage of death after this operation as correctly as possible. Mr. Bryant has pointed out, in a paper in the *Medico-Chirurgical Transactions*, on "The Causes of Death after Amputation," that amputations of the thigh for other diseases than that of the knee, such as, for example, different kinds of tumour, necrosis, elephantiasis, and deformities, are very fatal. In his paper 24 such cases, which are, to a certain extent, mere operations of expediency, are tabulated, with 11 deaths, or 45 per cent. In our own hospital 17 similar cases have resulted in death 13 times, an unusually large mortality.

On the other hand, Mr. Bryant gives 89 cases in which amputation was performed for chronic disease of the knee in Guy's Hospital, 13 only, or 14·60 per cent., proving fatal. In the Belfast Hospital amputation has been performed for the same reason fifty-four times, and 10 cases ended fatally, being a mortality of 18·51 per cent.

From the Bristol Royal Infirmary I have obtained a record of 28 cases of amputation for disease of the knee, 5 of which terminated fatally. In 2 of the fatal cases the patients were respectively sixty and seventy-five years old, and 3 of the deaths were caused by phthisis, soon after the operation. From St. George's Hospital Mr. Holmes has furnished me with a list of 20 amputations for

diseased knee-joint, which have occurred since 1865. Five cases, all adult patients, proved fatal. Mr. Holmes has also published an account of 35 cases in the *Medical Times and Gazette* for 1861, which underwent amputation for a similar cause prior to that date. Of this number 5 were fatal. In the same Journal for 1860 a statistical report is given of the operations in 16 provincial hospitals during 1859. Amongst them are 35 cases of amputation for chronic disease of the knee, with only 2 deaths. If these be added together we have a total of 261 cases of amputation of the thigh for chronic disease of the knee-joint. Of these 40 terminated in death, being a mortality of 15·32 per cent. But supposing these last 35 cases be not included in the computation, as affording an unusually high average, we have still 226 cases of this amputation with 38 deaths, or 16·81 per cent. This, it must be conceded, forms a striking contrast to the death rate in the 126 cases of excision, collected together in a precisely parallel manner, which amounts, as before stated, to 32·45 per cent.

No one will, I presume, be disposed to deny the importance of trustworthy statistics. If confidence can be placed in the manner in which they have been compiled, and in the sources whence they are derived, they must prove of great value, more especially if they be not mere numbers without knowledge; and nothing is, as I conceive, to be compared in this respect, for the purpose of procuring reliable returns, with the publicly-kept register of a general hospital.

As has been previously insisted upon, it is with amputation of the thigh for chronic disease of the knee-joint that excision can alone be correctly compared. It must be remembered, too, that amputation has to be performed on all sorts of cases, however desperate, in order to afford the patient a chance of life, whilst excision is practised, or should only be practised, on well-selected cases—cases, in short, which, if submitted to amputation, would almost certainly prove successful. Indeed, when the necessity for amputation becomes at all urgent, excision is usually out of the question, and the knowledge of this fact is, perchance, calculated to induce surgeons to excise joints which might otherwise have been restored to health by less radical measures. Again, in the statistics of amputation it may safely be assumed that the results of all cases, successful as well as unsuccessful, are recorded; whereas, in respect of a comparatively novel surgical method like excision, it may be quite as certainly concluded that a greater proportionate number of unsuccessful results have never been made public.

The inferences I should feel disposed to draw from the foregoing considerations are, that it would appear, firstly, that the death-rate after excision of the knee is at least twice as great as that after amputation of the thigh, both being had recourse to on account of disease of the articulation, and this does not take into account the frequent failures of the operation, entailing subsequent amputation, and occasionally death. Secondly, that the experience we possess, although still very limited, is distinctly in favour of resection of the joint for severe injury in civil practice, and that amputation, under these circumstances, formerly the invariable rule, may often prove unnecessary. Thirdly, that in military practice there seem to be no grounds for entertaining a hope of the successful performance of excision of the joint for gunshot wounds.

I do not wish to be understood to deprecate the operation of excision of the knee in eligible cases, as I consider it a surgical achievement of the first magnitude; and in some instances which have turned out successfully, the admirable result obtained, surpassing as it does any which may be attained by amputation, compensates for the increased risk, and prolonged and anxious after-treatment required. What I do object to, however, is the apparent desire evinced by some surgeons to shut their eyes to everything unfavourable to excision, while they as persistently ignore everything to the advantage of amputation. It is always in the interest of scientific truth that facts should be clearly and undisguisedly stated. I think the conclusion irresistible that the operation of excision of the knee is both more severe and more fatal than amputation; and that the prolonged after-treatment, extending over months, as compared with weeks in the case of amputation, exposes the patient, of necessity, to a greater number of the accidental risks incident to all operations. Amongst other considerations it should not be altogether forgotten that ordinary skill suffices for the after-management of a case of amputation, whereas difficulties, causing much anxiety and entailing the exercise of no ordinary care, are of frequent occurrence when excision has been performed. This objection is of small weight as applied to hospital cases, but it must have a certain influence upon the general introduction of the operation under circumstances where all the advantages of trained nurses, skilled assistants, and patient personal superintendence on the part of the surgeon himself are not so readily available.

Since writing these remarks, I have read with the most unmixed

pleasure and satisfaction Mr. Holmes' recently-published work on the *Surgical Diseases of Children*, in the course of which he devotes a chapter to "excision of the knee." After stating that he entertains so sincere an admiration for the operation as to believe that it will bear the truth to be told about it, Mr. Holmes adds that he believes it to be more fatal than amputation, and that he is aware of no reason why, under any circumstances, it should prove less so, being, in his opinion, a proceeding of at least equal, if not greater, severity. "But even," says this author, "if I thought that excision would always continue to prove more fatal than amputation, I should still practise it, because I think its results, when it succeeds, are so good that we are justified in running some extra risk to secure them."

I was much gratified to find the opinions I have endeavoured to justify in the foregoing paper were almost identical with those of a surgeon who had won for himself so eminent a position by hard and honest work.

I think enough has been now said to prove that excision of the knee is an operation only to be preferred to amputation where the circumstances of the case are very exceptionally favourable, and only after the most mature deliberation. At the same time I entertain the sincere conviction that the excision of joints, both for disease and for injury, is, in suitable cases, a real progress both in the principles and practice of surgery.

ART. II.—*Version in Contracted Pelvis.*[a] By JOHN RINGLAND, A.B., M.B., M.D., T.C.D.; M.R.I.A.; Fellow and Member of the Midwifery Court of Examiners, and formerly Censor of the King and Queen's College of Physicians of Ireland; Professor of Midwifery in the Ledwich School of Medicine; Senior Master of the Coombe Lying-in Hospital, &c., &c.

IT is now many years since the late Sir Fielding Ould suggested the operation of version as a suitable means of terminating a labour wherein a diminution of the conjugate diameter of the brim of the pelvis constituted the cause of delay. Since then Lachapelle, Radford, Sir James Simpson, Cazeaux, and M'Clintock have added the weight of their great experience in support of that recommendation.

[a] Read at a Meeting of the Dublin Obstetrical Society, 20th June, 1868.

The subject is one of such vast importance, and possesses so much of deep interest for the practical obstetrician, that even a single case added to the history of the subject may be esteemed of value. I therefore offer no apology for submitting the details of the following case, which presents features of considerable and practical value; and I have the less hesitation in doing so, as, in a paper submitted by me to this Society during its first session on March 7th, 1839, on "Labour rendered tedious by Anomalous Conditions of the Pelvis," I advocated "delivery by turning, when there is but slight contraction, and yet there does not exist sufficient space for the application of the forceps." I quote from a *résumé* of my paper, published in the 45th No. of the *Dublin Journal of Medical Science* for 1839, page 493.

I must premise here, that I am about to submit merely a continuation of the history of a case already brought under the notice of the profession. Dr. M'Clintock, under whose superintendence, in the Rotundo Lying-in Hospital, the first three of this patient's labours were completed, having in his able paper on "Turning in Cases of Disproportion," read before the London Obstetrical Society, fully detailed the particulars of these three labours, more especially the third, being one of the cases upon which his paper was founded; whilst Dr. Kidd, who had charge of her in the Coombe Lying-in Hospital in her three labours next ensuing, communicated the details thereof to this Society in his very valuable paper, "A Case in which Premature Labour was induced by the Use of Fluid Dilators," read on the 14th January, 1865, and published in the *Dublin Quarterly Journal of Medical Science* for February in that year. A short *résumé* from that paper will not, I conceive, be out of place here, but will rather constitute a suitable introduction to her subsequent history.

F. K. was delivered of her first child, a boy, on December 16th, 1856, under chloroform, by perforator and crotchet. Great difficulty was experienced in the operation, which occupied an hour and a-half, from the head being above the brim, and the conjugate diameter being contracted. She recovered well, but subsequently got an attack of pelvic cellulitis of the right side.

She was delivered of her second child on the 1st of April, 1858, after a labour of forty-two hours, the breech presenting. Chloroform having been administered, a leg was brought down, and a dead male child thereby extracted. The mother recovered well.

Her third child was born on November 12th, 1859, after a

labour of fifty-six hours, the greater part of which was at her own home. Shortly after her admission to the hospital she was placed under the influence of chloroform, and the left leg brought down; immense difficulty was experienced in extracting the arms and head. The child—a large male—was pale and flaccid, but the heart pulsated, and respiration, after a few minutes, was established. The mother and child left the hospital on the ninth day, both well; and it may not be out of place here to add, that the child is still living.

The Rotundo Hospital having been closed at the time of her fourth labour—April, 1862—Dr. M'Clintock sent her for admission to the Coombe Hospital. She had been many hours in labour before she presented herself. When examined the dilatation of the os uteri was found to be complete; but, owing to the narrowness of the conjugate diameter, the head had not entered the pelvis. Dr. Sawyer succeeded in applying Churchill's forceps, but in consequence of the extreme distance of the head, the lock and portion of the handles of the instrument were within the vagina. Under all the circumstances it was deemed expedient not to make further traction with the forceps, delivery by that means appearing to be impracticable. Version was then performed, one leg having been brought down; very great difficulty was experienced in bringing the head through the pelvis. The heart was feebly pulsating at birth, but respiration could not be established. The child was a male. The mother made a good recovery.

Acting on the advice given her prior to her leaving the hospital on this occasion, she presented herself for admission thereto about the termination of the eighth month of the next—her fifth pregnancy—it having been previously determined to induce premature labour. Accordingly, on the 29th of May, 1863, the vaginal douche of Kiwisch, as modified by Dr. Sinclair—who kindly lent his aid on the occasion—was applied for about fifteen minutes. Marked collapse ensued; but although only used the once, labour shortly set in (of a very languid character, however), the first stage not having been completed for five days. The second stage was short, and accomplished without difficulty. The child—a male—presented with the breech, and was born with the heart feebly pulsating, but respiration could not be established. The mother's recovery was very slow.

In her sixth pregnancy labour was again induced. This was effected on the 24th of November, 1864, being the 240th day from

the termination of her last menstruation, by means of "Barnes' Dilators;" frequent labour pains speedily succeeded their employment, which, however, after a time became irregular and feeble. A stimulating enema having produced no beneficial alteration in them, a full opiate was administered at two a.m. on the morning of the 30th, which produced sleep, after which the second stage of labour set in, and she was delivered of a rather large-sized dead male child; the head presented, and its passage through the pelvis was not difficult. The mother made a good recovery, and left the hospital on the ninth day.

For the particulars of her seventh labour I am indebted to the courtesy of Mr. Young, surgeon of the Monaghan County Infirmary, and Dr. Temple, of Monaghan. She was taken in labour in the evening of the 31st December, 1866, but the presentation was not then ascertainable. Mr. Young saw her three or four times between that and early the following morning, when he found the presentation to be the right parietal. At his last visit—about two a.m.—he was anxious to use a blade of the forceps to rectify the position, but could not prevail on her to submit to his judgment, or do anything desired by him; he accordingly—not being in good health at the time—discontinued his attendance, and that of Dr. Temple was procured. Her labour still proceeded slowly, but as the pains increased the head advanced. On the third morning—January 3rd, 1867—she became so worn and exhausted that Dr. Temple determined to perforate, which he effected without much difficulty, the patient having been first brought under the influence of chloroform. Profuse hemorrhage ensued, which was with difficulty controlled. She recovered slowly and gradually, and finally made a perfect recovery.

In her eighth labour, having proceeded to full term, she was admitted into the Coombe Lying-in Hospital at ten p.m. on the 21st April last, the membranes having spontaneously ruptured some time previously; although she had experienced severe pains, the os uteri—which was reached with difficulty—was found at this time to be only sufficiently dilated to admit the point of the finger. Uterine action altogether ceased for fifteen hours after her admission; at the expiration of that time, however, vigorous labour was established, and left parietal presentation ascertained. Dr. Kidd saw her shortly afterwards—namely, at about two o'clock p.m. on April 22nd—and had the advantage of the opinion and advice of

Dr. M'Clintock. As the os uteri was not yet fully dilated, and was somewhat rigid, the patient herself being very irritable and unmanageable, small doses of Antim. Tart., with Tinct. Opii. in Mist. Camph. were ordered at intervals of half an hour. At seven o'clock p.m. I saw her in consultation with Dr. Kidd, when the os uteri was found perfectly soft and dilatable, but not larger than half-a-crown, the head completely above the brim of the pelvis, and not making the least descent into it, even under the influence of the most powerful uterine action. The promontory of the sacrum projected downwards and forwards to a great extent, and the conjugate diameter of the brim was estimated, by mere digital measurement, to be from 3 to $3\frac{1}{4}$ inches, but no alteration appeared to exist in any of the other diameters. The pulse had now gone up to 120; she was very restless, and a copious olive discharge came from the uterus. Delivery by version was now determined on; she was accordingly brought completely under the influence of chloroform, and I experienced but little difficulty in introducing my hand and grasping both feet. Some little exertion was required to deliver the breech, and still more to bring down the arms. The funis continuing to pulsate, we were most anxious to complete the delivery with as little delay as possible, but it required every effort of Dr. Kidd and myself to bring the head through the brim; the transit through the outlet was effected with but slight difficulty, and it was with no little satisfaction we found that the heart was still pulsating, although its action was very feeble. After a few minutes our efforts at resuscitation were attended with success; respiration was established, and, after about an hour's attention, was altogether perfect. The child was a male, of good size, well thriven, and weighed 5 lbs. 15 oz., and left the hospital quite well. The mother was placed on a grain of opium every third hour. She did not suffer from a single bad symptom throughout her convalescence, and was discharged quite well on the tenth day after her delivery.

Whilst my hand was in the pelvis, during the course of the operation, I carefully examined its condition. The promontory of the sacrum projected forwards to a great extent, and when the finger surmounted it, the upper surface of the projection lay nearly at right angles with the concavity of the bone, to the extent of somewhat more than half an inch, and the spinal column thence ascended in its normal course. Moreover, immediately behind the left pubic bone, there existed a bony knot projecting backwards

into the pelvis, with an elevation of about a quarter of an inch. From these facts I am somewhat inclined to believe that a portion at least, if not all, the deformity of the pelvis, is the result of exostosis; and on mentioning these points to my colleague Dr. Kidd, he expressed to me his opinion that the conjugate diameter is somewhat less than when he saw this patient on former occasions; but as he did not note down the measurements, this is merely conjectural.

With the view to a proximate measurement of the deformity, I placed my hand directly across the antero-posterior diameter, the knuckle of the first finger being against the promontory of the sacrum, and that of my little finger against the projection behind the pubes, and I found it impossible to spread my hand completely flat. The measurement of my hand between the points indicated is exactly three inches; and as I was obliged to very slightly contract my hand while in position, I conceive I may fairly specify that of the diameter under observation at somewhat less than three inches.

An analysis of the history of this woman's eight labours gives the following results:—In her first and seventh labours she was delivered by craniotomy, with, of course, the loss of both children; in her fifth and sixth by the induction of premature labour, one child being still born and the other having the heart pulsating at birth, but respiration could not be established; in each of her second and third the breech presentation was converted into a footling; in one of these the child was still-born, and in the other the child was born alive and is still living; whilst in her fourth and eighth she was delivered by version, in the former of which the heart of the child pulsated at birth, but respiration could not be established; and in the latter the child was born and continues alive. Thus, of the four instances wherein delivery was completed by the feet, one of the children was still born; in one the heart pulsated but animation could not be established, and in two the efforts to induce respiration were attended with success; whilst in the other four instances the loss of the children resulted—strong testimony, I maintain, in favour of the operation of turning in other like cases.

However, whilst recommending this proceeding I must not be supposed as either altogether ignoring, or in the smallest degree detracting from the great difficulties and dangers which present themselves during the progress of the operation of version. Every

practitioner who has performed it knows but too well that such may arise in its every stage; and the history of the case I have now submitted proves that it offers no exception to this experience; had I not had the valuable aid of Dr. Kidd, at the close of the operation, to supplement my physical powers, utterly exhausted by my previous exertion, I apprehend that the child would, in all probability, have been lost, the great disproportion between the size of the head of the child and the bony passage, offering obstacles which demanded every effort we could jointly employ to complete the labour within the limited time compatible with the merest possibility of saving the child's life.

It would be impossible here to discuss the many difficulties of this operation; but it may not be uninstructive briefly to detail the particulars of two cases I have met with since the details of the preceding case were written, and which present some interesting features in illustration of the subject.

At about six o'clock on the morning of the 16th of May last, I was requested by Dr. Keiran to see a patient of his who was in labour of her third child. Her two previous labours were not attended with much delay, but the children were premature, and very small. Her present labour commenced at about six o'clock on the preceding evening, and proceeded steadily. The nurse did not deem it necessary to seek for the attendance of Dr. Keiran until 3 a.m., when he was summoned in consequence of the rupture of the membranes; but although the uterine action was very strong from the time of his arrival, no progress whatever was made towards delivery. When I saw her the head was still at the brim of the pelvis, very tightly fixed, the brow presenting, and the face directed to the pubes; the cavity and outlet of the pelvis were sufficiently roomy, but I could not make a satisfactory measurement of the brim, which, however, I subsequently found to be considerably diminished in all its diameters; the uterus was firmly and persistently contracted, and apparently moulded to the figure of the child; her pulse was quick and small, but she was remarkably cheerful. After the administration of a full opiate in some brandy I made several attempts, both with my fingers and with a blade of the forceps, used as a vectis, to rectify the position of the head, but in vain. I then applied Kennedy's short forceps, but failing to bring the ends of the handles within two inches of each other I withdrew them and resorted to a longer instrument—Murphy's long forceps, about 13 inches in length—but no force I felt justified

in using produced the least alteration in the position of the head. I now determined to resort to version, and, the use of chloroform being altogether contra-indicated by the state of the pulse, I administered a second dose—40 drops—of tincture of opium, and, after a brief delay to permit time for the action of the drug, I proceeded to pass my right hand, but experienced great difficulty and delay in doing so, owing to the still powerful action of the uterus, and its completely moulded apposition to the head of the child. By gentle but steady persistence for a lengthened time, I succeeded in overcoming the first obstacle, only, however, to encounter a virtual hour-glass contraction of the uterus tightly ligaturing the neck of the fetus. This stricture was with patience overcome, and my hand passed into the cavity of the body and fundus of the uterus, when after some little delay, owing chiefly to the numbness of my hand from the long pressure it had sustained, and which precluded my feeling whether there existed pulsation in the funis or not, I succeeded in grasping one foot, which, despite the still violent contraction of the uterus, I was enabled to bring down external to the vulva; beyond this, however, all the traction I dared use could not move it, the persistent uterine action precluding the version of the child and the descent of the nates. I now gave her 40 drops more of laudanum in half a glass of brandy and awaited its effect. After a lapse of about an hour, finding that the violent pains had subsided, I again proceeded with the operation; the foot which I had previously brought down had now receded, but was at the brim of the pelvis and in close proximity to the second foot. Both feet being thus within easy reach I grasped them and made traction, steadily and firmly, but without undue force, and I was gratified to find, after a few minutes, that the difficulty was overcome and the nates were descending. Owing to the general diminution in the size of the brim of the pelvis, great delay and difficulty arose in the delivery of the head. The heart of the child—which was a large-sized male—pulsated slightly after birth, but our efforts had not the effect of establishing respiration. I feel persuaded, however, that were it not for the very great obstacles which presented themselves in almost every stage of this case, and the delay consequent thereon, the life of the child might have been spared, to be another triumph to this operation. This lady was put on grain doses of opium every third hour, and she recovered without a bad symptom.

The next case to which I would direct attention is that of

a patient admitted into the Coombe Hospital, on the 16th June inst. She had been in labour for some hours previously, and was sent to the hospital by the midwife under whose care she was, in consequence of excessive hemorrhage. Dr. Kidd and myself having been in the hospital at the time of her admission, saw her immediately afterwards. The case was one of complete placenta previa, the os being soft and dilated to the size of about half-a-crown. Her pulse was so feeble, and her condition so low, that immediate delivery by version was at once decided on. Dr. Kidd had no difficulty in passing his hand and grasping a foot; when, however, the breach had descended so far as the perineum, all further progress was arrested; and on relaxing his tension on the limb to ascertain the cause, it receded to a considerable extent. He now found that the funis—which we subsequently ascertained was very short—had been caught between the nates of the child, which was thus slung up and precluded from descending below the point the strained funis permitted. The tension having been completely relaxed, Dr. Kidd was enabled to slip the coil of the funis over the hip of the limb still in utero, and this difficulty was thus overcome. The delivery of the shoulders was effected without much difficulty. The opposing diameter—the occipito-mental—of the child's head having been converted into the occipito-frontal, Dr. Kidd proceeded with the delivery through the brim of the pelvis; but with all the force he dared to use he could not succeed in this, and being utterly exhausted by his fatiguing exertion in the early part of the operation, he requested me to take his place, and although coming fresh and unwearied to its performance, it was not until after considerable delay, and the use of all the strength and energy I possessed, that I was enabled to complete the delivery of a very large male child. It was thought that its heart pulsated after birth; respiration, however, could not be established. In consequence of the excessive hemorrhage the brim of the pelvis was not carefully examined prior to the operation, but a subsequent examination demonstrated a very great contraction of all its diameters. This patient made a good recovery.

Before I close this communication there is one point connected with the first case I have detailed, which appears to me to possess so much interest in a medico-legal point of view, that I would not feel justified in omitting mention of it. In the *Dublin Quarterly Journal of Medical Science* for May, 1865, page 491, I have published the particulars of three cases wherein accidental injuries

arose to the fetus in utero. The possibility of such accidents in the parturient woman has been frequently questioned, and were circumstances similar to those I have specified to arise in any case wherein suspicious features presented themselves, and no undoubted evidence to the contrary could be found, innocent parties might be inculpated and unmerited odium cast on those altogether blameless. I therefore add the present as a supplement to my former cases. It will be recollected that I have stated in the case of F. K. that "the left parietal bone presented;" that "the promontory of the sacrum projected downwards and forwards to a great extent;" and that "when the finger surmounted it, the upper surface of the projection lay nearly at right angles with the concavity of the bone, to the extent of somewhat more than half an inch." Thus the right parietal bone was in direct apposition with the projecting promontory of the sacrum, against which it was pressed for a lengthened period by the violent action of the uterus. When the delivery was completed a deep depression was found across the centre of this bone from the sagiteal to the coronal suture. We at first thought we could feel a crepitus in the bone, but subsequent examination did not confirm this opinion. I have not seen the child for some weeks, but on the last occasion it was with me I could not discover any appreciable alteration in the depression; still no untoward symptom of any kind had up to that time arisen. The mother was in attendance with the child at the last meeting of this Society, when I had hoped, had time permitted, to have been enabled to submit it for examination together with this communication. I have, however, since lost sight of them, and I regret that I have been unable to procure their presence at this meeting.

ART. III.—*Gunshot Wound of the Knee—Excision of the Knee-Joint.* By HENRY THOMPSON, M.D., Surgeon to the Tyrone County Infirmary, Omagh.

THE history of the operation of resection of the knee is, I believe, as far as the continent of Europe is concerned, as yet incomplete in the want of a case in which the operation has been performed, as a *primary* measure, in consequence of a wound.

Mr. Butcher has published an elaborate and very valuable list of all the known cases that have occurred without one, in which the

joint has been excised for a "recent injury or a gunshot wound," though he alludes to the applicability of the proceeding under such circumstances, and mentions its obvious conditions as depending on the amount of injury sustained by the soft parts as well as the bones. But as, in surgery, more perhaps than in any other art or science, one fact is worth a thousand speculations; and as that fact has happened to fall in my way in reference to this most important operation, I feel that I need make no apology for adding it to those already collected, in the hope that it may contribute to the settlement of the question as to the best course to be pursued in such cases—a question which, as I think, every surgeon will admit, is not yet finally determined.

The simplest injury penetrating the knee-joint is a wound of the most serious character, more so, of course, if it involves the bones or cartilages, and much more so if inflicted by a gunshot with all its consequences of inevitable sloughing and suppuration. A complete recovery from a simple incised wound of the joint is so rare that it must be looked upon as an exceptional escape, yet it has occurred sufficiently often to justify the rule that it should be always attempted. But when there is laceration to any considerable extent, and, *a fortiori*, when the bones are implicated, or the force such as involves *contusion*, it becomes a question whether it be not the best practice to proceed at once to deprive the parts engaged of that peculiarity which renders the injury so dangerous, by the removal or the destruction of the serous shut sac, the distinctive pathology of which is its cause.

This being determined, the question then arises as to how this object may be attained, and my reply would be that where the bones are injured, and the wound inflicted by gunshot or any similar violence, such as a railway crush, for instance, the object will be best attained by excision. Where the wound is merely a lacerated one, with all chance of union by the first intention excluded, it may be possible that, laying the joint open by a wound as extensive as that for excision, without interfering with the ligaments, might induce a healthier and more circumscribed form of inflammation than that which usually follows such injuries.

These reflections have been latterly forced upon my mind by the occurrence of three cases, two in my own practice and one elsewhere in which I was much interested. They were all gunshot wounds of the knee-joint. In the first, which occurred to myself,

the ball passed through from behind forwards. The young man recovered, with a very trifling amount of exfoliation, and with a stiff limb, but after an illness so protracted and dangerous that it determined me as to the propriety of excision should any such case occur to me in future. The second case was one in which the ball did not pass through, but lodged in one of the condyles. This one was fatal, no operation having been performed, and its result increased my determination, the propriety of which was put to the test sooner than I expected, for gunshot wounds of the knee-joint are not common in civil practice, whether rural or metropolitan. Nevertheless, one very soon after occurred to me, the details of which I now proceed to describe, and the result of which is eminently favourable to the advisability of the treatment pursued.

Case.—Peter M'Sorley, a healthy young carpenter, aged twenty-seven, was admitted into the Tyrone Infirmary on the 29th of February, 1868, at six p.m.

At about seven o'clock on the morning of the same day a friend in whose house he was passing the night, in some unexplained and inexplicable fit of desperation, fired a gun at him. In order to avoid the shot, which would otherwise have gone through his heart, he threw himself back on a bed, bending up his knees before him at the same time. The gun went off, and the charge, consisting of shot and slugs, entered the right knee-joint on the outside of the ligamentum patellæ, and passed out in the mesial line immediately above that bone, which was shivered into innumerable fragments, the skin over it remaining uninjured, though scorched and blackened by the powder.

The finger could be easily passed into the joint through the large and ragged wound of the orifice of entrance, detecting extensive injury of the condyles of the femur, and through the orifice of exit a sharp spicula of the shattered patella protruded about an inch. The man, when I saw him, four hours after his admission—having been away on a distant visit—was in a profound sleep, having partaken freely of whiskey during the day, and having had no sleep during the two previous nights, and a dose of laudanum having been administered on his arrival at the hospital.

Under these circumstances I merely removed the projecting portion of the bone, which was catching in the bedclothes whenever he moved, and wrapping a wet napkin round the wounded part let him sleep on until the morning of Sunday, the 1st of March. The

night afforded me ample time to consider the case, and confirm my previously-expressed determination, that should such a case occur to me I should excise the joint. Accordingly, at ten o'clock, a.m., all the necessary apparatus having been previously prepared, the patient was brought into the operating room, and, assisted by Dr. Love, the dispensary surgeon, and Mr. Trenor, the hospital assistant, I proceeded to operate. The leg was held in the extended position, and chloroform having been administered, my first step was to lay open the joint, which I did by a single semi-lunar incision, commencing a little above the projecting part of the inner condyle, traversing the orifice of entrance, and terminating externally about the centre of the outer condyle. The flap formed by this incision was then raised, and the interior of the joint thus freely exposed. It was full of bloody serum and fragments of the patella and femur. These I did not wait to remove, but at once divided the lateral and crucial ligaments, and telling the assistant to bend down the leg, thus threw out the end of the femur, which was found in the following state:—The charge had struck it in the fossa, between the condyles, and had scooped out a piece about the size of a walnut, which was entirely detached. From the upper end of the cavity left by the separation of this piece a fissure extended outwards, completely separating the outer condyle from the shaft, but without displacement, as the periosteum was entire, and kept the split parts together. This fissure ran obliquely upwards, and ended at the back of the bone clear above the condyles. The inner condyle remained unseparated from the shaft, and thus explained the fact of the man having been able to take a step or two after receiving the wound for the purpose of striking his assailant, on whom, before he fell from loss of blood, he left an unmistakable mark of identity, in the shape of a well-blackened eye.

My first thought, on seeing the great extent of the injury, was that it was too much of the femur to remove with any hope of success, so that having cut through the bone about half an inch below the upper end of the fissure, I was about to finish the operation by slicing off a posterior flap when a look at the handsome symmetrical leg lying before me entirely uninjured, decided me on making the attempt to save it, and so carry out my original intention. I therefore rapidly cleared the edges of the head of the tibia, and sawed off the thinnest slice I could accomplish from it. I then turned my attention to the anterior flap, and carefully removed

from it the *debris* of the patella, and all the shot, slugs, and other foreign bodies I could discover; I tied one small vessel at the back of the joint, and then brought the sawn surfaces of the tibia and femur together, that of the former of course very considerably exceeding that of the latter in size; but that could not be avoided without sacrificing so large a portion of the tibia as would destroy all chance of success. So they were placed in as accurate apposition as possible, and the edges of the wound brought together and retained so, by three points of suture, straps of adhesive plaster, pledgets of lint, and a many-tailed bandage; the limb was then placed on its cushion in a box with folding sides, well padded, and he was then slipped over the end of the table into his bed with great ease and comfort. He said he was much easier than before the operation, and did not betray the slightest symptom of shock or faintness. He only complained of a cold sensation in his foot. This led me to examine the tibial arteries, and finding them both pulsating vigorously I covered the foot with a warm sock, and ordered an india-rubber bag, filled with hot water, to be applied below the footboard. He was then ordered a couple of glasses of wine, and left to his repose.

March 1st.—7.40 p.m. Skin hot; pulse 132. Some thirst. Says he is "first rate;" feels no pain or uneasiness, and has slept tranquilly. Free sanious oozing from inside of wound. Bowels have been freely moved, and he has passed water. Complains of nothing but the uneasiness of being confined to his back.

March 2nd.—Slept comfortably the most of the night. Makes no complaint, except that the inner side of the box hurts his perineum. On its being moved down a little he said he was all right. Pulse 120; coldness of foot gone. There has been sufficient oozing to stain all the dressings. Ordered six ounces of wine daily, and beef-tea, a pint. 9.30 p.m.—Had some pain for an hour to-day consequent on some start of the limb. It soon subsided, and he has been since quite easy. Is very cheerful, and full of hope and courage. Pulse full, soft, and 120. Skin cool, tongue moister; no thirst. He has finished his wine. Ordered two glasses more for the night. Bowels have been moved naturally.

March 3rd.—Was a little restless last night from pain in the back, caused by posture. It left him, however, and he slept well for several hours in the morning. Pulse 116. Diminish wine to six ounces. 9.30 p.m.—Quite easy all day. Skin hot to-night. Tongue white and dry; more thirst; slight fulness of thigh; slept

tranquilly in the evening. Omit wine for this night; whey *ad libitum.* Had some stirabout and buttermilk for supper. Bowels natural.

March 4th.—Slept well. Full appearance of thigh continues, but no tension, or redness, or pain. Pulse 116. Skin hot, and tongue white. May have his three glasses of wine to-day. Evening.—Pulse 108. Dressings beginning to have bad smell.

March 5th.—Had a pretty good night, somewhat disturbed by starting, of which he now complains for the first time. Skin cool, pulse 96; tongue whitish, with red tip; appetite good; thirst slight. Free brown purulent discharge appearing through the dressings, and flowing along the leg. The bed, dressings, and all being dirty and offensive they were removed to-day. The inner half of the wound had united; brown pus was issuing from the outer side and from the gunshot orifices, which were occupied by shreddy sloughs. The limb lay in good position, and showed no tendency to any kind of displacement. It was raised, and fresh dressings laid under it; wet lint, covered with sheet gutta percha, over the wound; and the box, with clean pads, having been reapplied, he was lifted up and slipped over into a clean fresh bed, placed in a line with the one he lay on. Ordered eight ounces of wine daily, beef-tea, and meat. Evening.—Has been most comfortable all day; in excellent spirits; pulse 108; skin slightly hot.

March 6th.—A good night. Pulse 96. Suffers no pain. Dressings stained by discharge. Evening.—Had some uneasiness in knee to-day; but finding it was caused by his head and shoulders being too high, a pillow was removed, and he has been easy since.

March 7th.—The best night since operation; perspired slightly; bowels twice open yesterday. Skin cool; pulse 92. No discharge from inner side of wound; that from outer abundant and healthy. The dressings were changed to-day. The pain caused by raising the limb for the purpose not greater than in any compound fracture; sloughs separating quickly.

March 8th.—Pulse 84; skin cool; several large sloughs came away from interior of joint. Wound looking healthy.

10th.—Sloughs coming away daily, and discharge diminishing. Dressing changed from wet lint to calamine cerate, with compresses of tow and gentle pressure. Gets five glasses of wine in the twenty-four hours.

15th.—Several pieces of bone, with grains of shot and sloughs, have been removed daily from the wound chiefly above patella.

There is a very profuse purulent discharge, but his strength keeps up well, and all his functions are healthy. He has had no medicine of any kind since the operation. The strictest attention is paid to cleanliness, the wound being dressed daily, and the bed changed as often as necessary.

17th.—An attack of diarrhea yesterday evening, continuing all night; evacuations feculent.

℞. Tinct. opii. gtt. xx.
Tint. rhei. c. ʒi.
Aqua cin. ʒss. m.
Ft. haust.

Evening.—No motion since. Omit stirabout and beef-tea, and change sherry for port wine; to have boiled rice with his meat, repeat draught at bedtime.

18th.—Bowels open three times this morning without pain. Discharge from wound healthy, and much less. Some paper wadding in a state of pulp came away to-day. He takes ʒss. of chalk mixture, with five drops of tincture of opium thrice a day, and a draught with twenty drops of tincture of opium, at bedtime.

March 20th.—Bowels quiet since yesterday. Omit medicine.

26th.—A piece of bone to-day from the orifice of exit. A splint of wet leather was applied to the back of the limb to-day from the middle of the thigh to lower third of leg.

28th.—Splint, quite hard and firm, was removed, trimmed, lined with soft lint, and reapplied.

April 6th.—The wound dressed every day since, several small portions of bone, shot, paper, &c., being removed from time to time, the presence of which keeps up the discharge from the shot wounds. General health excellent. Great advantage manifest from the leather splint, which keeps the limb quite firm and steady, and by means of which it can be raised with the greatest ease. The wounds have been latterly dressed with slips of lint wet in tincture of matico, covered with others dipped in a solution of carbolic acid.

April 12th.—Showed me to-day how he could move the whole limb in one piece, rotating the foot from side to side.

16th.—Removed a slug from orifice of exit.

18th.—A small bit of bone removed.

April 29th.—The limb was taken out of the leather splint to-day, and found quite firm at the knee.

May 4th.—A bit of bone removed from bottom of sinus. Wound

now dressed with lint wet in a solution of sulphurous acid under the carbolic acid, and it has had a remarkable effect in hastening the healing process.

10th.—Two-thirds of incision healed, a third remaining not yet cicatrized in the centre. The limb was taken out of the case to-day, and seemed perfectly firm, resisting any attempt I made to produce motion. It is quite as firm as could be expected in a compound fracture of same age.

May 14th.—Removed a bit of bone the size of a large pea to-day from the orifice of exit, from which there continues more or less discharge. Limb quite firm. Removed box, and bandaged it up with a roller in its leather case, allowing him to lie on his side, at which permission he expressed the greatest satisfaction.

May 15th.—The removal of the last bit of bone has produced a wonderful change for the better. No discharge from sinus to-day, and wound cicatrizing as fast as possible. Sits up in bed every day now. The limb is quite rigid, and not more than two inches shorter than the other. This is curious, for, as I should have mentioned before, there were two inches and a half of the femur removed, exclusive of the thin slice of the tibia, which was not more than an additional eighth in thickness, except in the centre, where the ridge exists that projects between the condyles, where, of course, it was thicker. There can, however, be no mistake about the fact, that there is not a loss of more than two inches in length.

May 18th.—At this time I was obliged to leave home, and was away until the 1st of July. I left orders that he was not to be allowed out of bed for a week after the complete cicatrization of the wound. It was not very long until this was completed, and at the end of the prescribed period he was allowed out of bed, and on my return I found him up and going about with a crutch and a stick, and able to bear sufficient weight on the limb to enable him to take a step with the other. He had discarded the leather case, and the limb was without any support whatever. The wound entirely healed, and he was daily acquiring some additional power over it. I directed the hospital steward, who is a carpenter also, to ascertain how much would be required to be added to his heel to make up for the deficiency in length, and his report was, "Exactly one inch and a half." The case is thus complete, and the man might have been at home a fortnight ago, had he not waited for my return.

This operation is one which I had never seen anyone else per-

form; but I had done it once before myself, and successfully, as far as the operation was concerned, bony union having taken place; but the patient died two years after of visceral disease, which was not detected at the time of the operation.

I was, therefore, obliged, of course, on both occasions, to depend on the description of others, and my own pretty large experience of operations in general.

I did not adopt the plan most recommended; in fact, I could not see why I should make three separate incisions when one would serve my purpose. I therefore adopted the single semi-lunar incision, and found it quite sufficient. The only other point in which I differed from the mode most approved of was that I sawed the bones from before backwards, and not from behind forwards, and found the former plan perfectly easy, and unattended by difficulty or danger. The saw I used is one I have been in the habit of using in all cases for many years past. It is on the same principle as Butcher's—a narrow blade strained in a frame, but the blade is three inches longer, and the frame is divested of all the useless top hamper which makes Butcher's saw top-heavy and unhandy. Mine has also a good efficient handle like that of the old amputating saws. The blade is fixed in hexagonal, not cylindrical pivots, so that it is firmly held in whatever position it is placed in, and can't turn, and it is strained by a bar running through a *square* slot in the top of the frame, and shortened or lengthened by a nut with a milled head. I cut the pattern out on a piece of paper, accompanied by a short description of what I wanted, and sent it to Weiss several years ago. He sent me the saw a fortnight after, and I have no hesitation in saying that it is the best I ever had in my hand for general use. Comparing the operation of excision of the knee-joint with amputation either above or below the joint, I am impressed with the conviction that the effect on the constitution, which we call *shock*, is less in resection than in amputation, and this I attribute to the circumstance of no large nerve being divided in the former operation.

As to the utility of the limb after excision of the knee, in my opinion there can be little doubt that it is preferable to any artificial substitute. In the case which is the subject of this paper, the patient very much prefers it, and his judgment on such a question is not to be despised.

An ankle-joint, moved by the voluntary power of the muscles of the leg, is an advantage not to be attained by any artificial means,

however ingenious, and one which, no doubt, renders progression much more easy and satisfactory. Then there are no wear and tear, no constant repairing of old legs and procuring of new ones, no straps nor buckles, nor any of the many other inconveniences inseparable from the necessity of carrying about an artificial limb.

ART. IV.—*Notes on the Mediæval Leper Hospitals of Ireland.* By T. W. BELCHER, M.A., M.D., Dub.; Fellow of the King and Queen's College of Physicians in Ireland; and Physician to the Dublin Dispensary for Diseases of the Skin.

AMONG the many contributions to antiquarian lore of that eminent member of our own profession, Sir James Young Simpson, few are more interesting than his learned papers entitled "Antiquarian Notices of Leprosy and Leper Hospitals in Scotland and England."[a] As regards Ireland, however, I am not aware that there is any published account of Mediæval Leper Houses; and I have here attempted to collect a few "*disjecta membra*" to supply to some extent this historical want, until some one better qualified than I am, can give as full a history of our Leper or Lazar Houses as Sir James Simpson has given of those of England and Scotland.

The following is a short summary of the facts collected by Sir James Simpson regarding the extent and constitution of these hospitals, and I give it here because it applies equally to those of our own country, which, like all others, were founded on an ecclesiastical basis.[b]

From information collected by Sir James Simpson from English and Scottish MSS. and records—from *Dugdale's Monasticon Anglicanum*, *Semler's Historiæ Ecclesiasticæ Selecta Capita*, *Schilling's Commentio de Leprâ*, and other authorities—we learn that a disease, popularly known as leprosy, was everywhere endemic from the tenth to the sixteenth century, and that against it princes and courts enacted laws and popes issued bulls, particularly Alexander III., who issued a famous bull—"De Leprosis"—regarding the ecclesiastical separation and the rights of the infected. A particular order of knighthood, that of St. Lazarus, was instituted to care for the sick, particularly lepers, one of whom

[a] Edin. Med. and Surg. Journ., Vols. lvi. and lvii.

[b] Taken from my Edition of Neligan on Diseases of the Skin. Dublin, 1866. Pp. 315, &c.

they had had to elect as their master, until countermanded by Pope Innocent IV. They separated from the Knights Hospitallers about the twelfth century.

In the middle ages leper hospitals were common everywhere. In 1226 there were 2,000 of them in France, limited as its territorial extent then was, while in England they were numerous and wealthy. They were receptacles for infected persons—not medical institutions, because the disease was considered incurable—and were mostly religious establishments, under the sway of some neighbouring abbey. By papal order they all had chapels and ecclesiastics. Thus, in the leper hospital of St. Giles, at Norwich, there were a prior, eight canons regular, two clerks, seven choristers, and two sisters, to minister to the wants of eight bed-ridden lepers. At Illeford, in Essex, they had very hard religious duties, no end of prayers occupying them from early morn till near midnight; and at St. Julian's, at Saint Alban's, Abbot Michael made some very significant rules "de accessu mulierum." From the extant laws of Sherburne Hospital it seems that refractory lepers were occasionally chastised with the birch, "modo scholarium." The lepers had abundant and good diet and clothing; and, from some extracts from MS. diet rolls and clothing lists of the lazar houses, it would seem that not only were all their wants provided for, but that sanitary rules of the best kind prevailed among them. They were often regarded as objects of compassion, and yet were often persecuted. Thus kings and queens used to visit them, wash, and sometimes kiss them, to exhibit pious humility; while, on the other hand, Philip V. and Charles VI. of France enrolled themselves among scoundrels of the first water by burning these poor wretches alive, to grasp their hospital endowments. Sir James Simpson proves that this disease existed in Europe before the Crusades, and was not brought to England by the returning warriors, as is generally supposed, since leper houses existed in various places long before the occurrence of the first crusade of Peter the Hermit. The largest leper hospital in England was at Sherburne, near Durham, and was built by Bishop Pudsey in 1181. In the sixteenth century, when this disease had nearly disappeared, secondary cases of the then new disease—syphilis—were largely admitted to the leper hospitals, which at that period were almost empty. In Scotland the lepers used a rattle to warn persons of their approach, and some similar usage prevailed in Italy. By English law they were classed as idiots, or insane, were counted dead, and could not inherit. The

church performed burial rites over a leper on his admission to hospital; he was clothed, and in every respect treated as a corpse in *foro ecclesiæ*. In France, until lately, the rituals retained the offices for the separation of the leper from the living. They appear to have been most touching, and must have been heartrending to the miserable outcast. They were concluded by the significant act of throwing a shovelful of earth on the leper.

Although Sir James Simpson refers to *Ledwich's Antiquities of Ireland*, as giving information respecting leper houses in this country, I have not found account of any such; all Ledwich says is that the ancient Irish were subject to leprosy; contracted, according to general opinion, from their constant use of raw meat; and that *aqua vitæ*, or whiskey, was held in great repute among them as an unfailing specific for its cure. Hence, perhaps, the national attachment of our countrymen to that useful medicine.

So far as I have been able to ascertain, the Irish houses of any note were Anglican foundations; but frequent mention of the disease is made in ancient records. In these records the term leprosy seems to have indicated merely cutaneous disease, and not any particular kind or variety. Thus, for example, small-pox is spoken of as leprosy.

(From Report on Table of Deaths —Census of Ireland, 1851.)

The first notice of leprosy in Ireland occurs in *Colgan's Acta Sanctorum*, from which it appears that, A.D. 432, "St. Patrick maintains a certain leper in his house, and washes his sores with his own hands."

A.D. 546, "Nessan, a leper, died."—*Annals of Innisfallen.*

A.D. 551. "St. Nessan, the leper [*Lobhar*], died."—*Annals of the Four Masters.*

A.D. 555. "Nassan, the leper, died."—*Annals of Clonmacnoise.*

A.D. 550. "The pestilence, which is called *samtrusg*, the mange, scurvy, or leprosy, raged this year."—*Chronicon Scotorum.*

Numerous entries of this kind occur showing the recognized existence of some disease or diseases called leprosy. Soon after the first Danish invasion, A.D. 835, we thus find the first mention of a leper hospital in the Annals of Innisfallen, under date A.D. 869—"Devastation of Armagh by Arlaf, so that the city was burned with its houses and hospitals [*nosocomiis*, or leper houses."]

From *Archdall's Monasticon Hibernicum* it appears that the monastic leper houses commenced very soon after the Anglo-Norman invasion. In A.D. 1185, a leper-house which had pre-

viously been established at Waterford, was confirmed to the poor through the Benedictines; and in 1192, another was erected at Kilbrixy, County Westmeath, and dedicated to St. Bridget. In 1344, the Hospital of St. Stephen was erected in Dublin on the site at present occupied by Mercer's Hospital, where the cemetery still exists. The present St. Stephen's Church, in Upper Mount-street, is the successor of the parish church of St. Stephen, which in turn was the successor of the hospital and hospital church, suppressed at the general dissolution of religious houses in the reign of Henry VIII.

There were beyond doubt many more leper houses in Dublin; but, strange to say, all records of them seem to have perished, while preserved in other places of lesser note. One stood on the rising ground north of Townsend-street, formerly called Lazar's Hill; and in this locality, tradition says, many miraculous cures of lepers were performed.

This hospital seems to have been the same as "The Steyne Hospital, founded by Archbishop de Loundres, about the year 1220, in the district of Le Steyne, or the Stane, otherwise called Lazar's Hill, or Lazie Hill, about where Townsend-street is now."—(*History of Mercer's Hospital*, by Horatio Townsend, Esq. Dublin: G. Herbert, 1860.)

According to the Rev. Dr. Reeves, who gives it on the authority of the *Repertorium viride*, a statement of the Dublin churches, written by Archbishop Alan, in 1523, St. Stephen's was a leper hospital; and Dr. Reeves further remarks that the church of Ballyloucher, or Ballylower, near Kilgobban, was a dependency of St. Stephen's hospital—(*Calend. Cancell.* p. 157, n. 69); and that the Irish word Ballylower signifies Leperstown, which has been corrupted into Leopardstown. This statement as to St. Stephen's hospital is corroborated by the following, extracted by Whitelaw (*Hist. of Dublin*, Vol. i., p. 391), and supposed to be dated about 1360 or 1370:—

"A gift from Ellena Multon to God and the Blessed Virgin, and St. Stephen, the proto-martyr, and to the poor lepers of the city of Dublin, resident therein, of two acres of ground whereon stood the chapel of St. Stephen, near Dublin, with a small meadow called —— Mary's, to the east of the said chapel, to hold in perpetual charity for the support of the said poor for ever."

In the year 1408, reign of Henry IV., there was a leper house near Wexford, for Archdall says (p. 759):—"King Henry IV., on

the 26th of January, 1408, and 10th year of his reign, granted to the son of William Rochford, during life, the custody of the hospital for lepers, under the invocation of the brethren and sisters of St. Mary Magdalen, near Wexford, with the lands, rents, possessions, churches, tithes, &c., thereunto belonging, the said John to support the houses, buildings, &c., and to defray all other expenses at his own proper cost." And respecting others, "in the early editions of *Ware's Antiquities of Ireland* (although not in the ordinary authorities), we read that after Hore Abbey, founded for Cistercians, by David MacCarwil, Archbishop of Cashel, in 1272, was erected, the hospital built by David de Latimer for lepers, b united to this abbey." In or about 1376, "we read in *Whitelaw and Walsh's History of Dublin*, of a grant to the poor lepers of the city of Dublin;" and in 1421, we find another notice of "the leprous house of St. Stephen, near Dublin."—(*Report on Tables of Deaths*, p. 91.)

In 1467, Archdall says, "a hospital for lepers was founded under the invocation of St. Bridgid, at the village of Hospital," in the county of Limerick; and about the same time, says Sir W. Wilde, a similar institution was built and endowed at Dungannon, in the county Tyrone.—(*Report on Table of Deaths*, p. 94.)

Previous to the time of Henry VIII., there was a leper house in Galway, for in the life of Bishop Kirwan (Meehan's translation), quoted by Sir W. Wilde, we read that: "in 1543, in the eastern suburb of Galway, stood the building of St. Bridgid's church, a long time inhabited as a lazar house; this place, almost destroyed within our own recollection, did he [Bishop Kirwan] re-erect in 1648."—*Report on Tables of Deaths*, p. 108. "And he laid, too, the foundations of the church sacred to St. Bridgid, which the lepers were wont to frequent for hearing mass."

In *Hardiman's History of Galway* an assertion is made (regarding this hospital), respecting the mode of its support, which is of some interest. It is professedly taken from the "*Town Annals*," which Sir W. Wilde states are not now accessible; it reads thus:—

"St. Bridget's hospital, in the town of Galway, was founded for the poor of the town, and each burgess was obliged in his turn to send a servant to collect alms every Sabbath day for its support—a custom which was long after observed. This charitable institution was fortunately completed in the year 1543, when the Sweating Sickness broke out, and raged with great violence, destroying multitudes of the natives, and particularly the tradesmen of the town."

At Dungarvan, says Archdall, "an hospital for lepers was built here and endowed under the invocation of St. Bridgid, but we know nothing further of it."—P. 689.

Of the leper-house at Hospital, near Lismore, the date of the foundation of which I have already noted, we know nothing more than is told us by Archdall (p. 694), who says, "an hospital for lepers was founded here under the invocation of St. Bridgid, to which several lands did belong, as appears from a registry compiled sometime after 1467, when the master of the hospital, styled Prior of Lismore, was in his 120th year. At the time of the general suppression, these lands were unknown."

Mention has been made of the Waterford Leper Hospital, and more than mere mention ought to be made of it, because it is the only one actually remaining in use, and bearing its original name at the present day. It was, according to tradition, founded by King John, and was endowed for lepers by the Power family. "This hospital (observes Archdall) must have been erected before the Benedictine abbey (in Waterford), for John, Earl of Morton, in his charter to that abbey, confirmed the leper house to the poor of the city."

In *Smith's County History of Waterford*, written before 1745, the following account is given of this institution:—

"The Leper House or Hospital of St. Stephen, in this city, situated in St. Stephen-street, was first endowed by the family of the Powers, with the lands called Leperstown, in the parish of Killea, about five miles from this town; they are set by the master of the hospital, who is appointed during pleasure by the Mayor, Sheriffs, and Commons, at a small salary, and has a clerk as an assistant. It is also endowed with other lands and tenements in and about the city. Formerly about fifty poor used to receive a yearly allowance by the master's hands. But as it was thought that a publick infirmary would best answer the intent of the pious benefactors, since the leprosy is not a disease now much complained of, it has been thought proper to endow an infirmary for the reception of such sick and wounded poor as shall offer themselves to the attending physician or surgeon to be cured. There are at present (1745) two houses fitted up with beds and other accommodations for forty sick; one of these houses is endowed by the Earl of Tyrone, who is possessed of the estate of the founders in this county, by a fund of £3,110, put to interest at 5 per cent. for this purpose, the house being given by the city. As these houses are

contiguous, the same persons attend both. The physician attends gratis, and the surgeon has a salary from the city of £30 per annum, and £20 from Lord Tyrone. There is one housekeeper at £6 per annum, and four nurses at forty shillings per annum each. Out of the remainder of the leper fund the Corporation gives £100 a year to decayed housekeepers." I suppose the funds of this hospital are still fairly applied, and have neither been confiscated nor jobbed away. In these days when our legislators assume to tear up our ancient landmarks, to alter men's wills, and dispose of their property very differently from the intentions of the testators, it is refreshing to find in Ireland at least *one* ancient remnant of the true Christian charity of past ages, which has survived the attacks of the legal robber and the unholy usurper. The last recorded case of a leper in this hospital, or, indeed, in this country, occurred in 1775; but should any disease of this kind—as it may—become again prevalent in Ireland, the citizens of Waterford will have no occasion to found an hospital for its treatment. Whatever may have become of the endowment of these houses, their own disappearance is thus accounted for in Dr. Gerard Boate's well-known *Natural History of Ireland*, first published in 1652 (p. 184):—"The rickets are of late very rife in Ireland, where few years agoe unknown; so on the contrary it hath been almost quite freed from another disease, one of the very worst and miserablest in the world, namely, the leprosie, which in former times used to be very common there, especially in the province of Munster; the which therefore was filled with hospitals, expressly built for to receive and keep the leprous persons. But many years since Ireland hath been almost quite freed from this horrible and loathesome disease, and as few leprous persons are found there as in any other countrie in the world; so that the hospitals erected for their use, having stood empty a long time, are quite decayed and come to nothing!" Dr. Boate proceeds to account for the disappearance of the disease, which he thinks was "merely through the fault and foul gluttony of the inhabitants in the excessive devouring of unwholesome salmon," and states that the English at an early period made severe laws against taking salmon out of season, and so caused the disease to disappear.

As regards the house at Kilbixy, the foundation of which has been already noted, all we can gather is taken from Archdall, who says (p. 720):—"This ancient town, in the barony of Moygoish, and about a mile west of Iristemagh, was adorned with a castle, erected by Hugh de Lacie in 1192, and a monastic edifice, or rather

an hospital, built for the support of lepers, and hence it acquired the appellation of the Leper House of St. Brigid."

In the County of Down there were formerly leper houses at Downpatrick and at Kilclief. Of the former Archdall says (p. 118) this hospital was dedicated to St. Nicholas, and, with the hospital of St. Peter at Kilclief, was, on the 20th April, 1413, granted in custodium to John Young, John Molyn, and Walter Celey, with all their lands, tenements and appurtenances, being then in the King's hands for certain causes; to hold the same as long as they should continue in his Majesty's possession.

There was formerly a "Leper's Old Hospital of St. Stephen's" in Cork. It was governed by a prior; and later (temp. Ric. II., and Hen. IV.) by a guardian appointed by the King. It gave place to the parish church of St. Stephen, to which was attached, as an endowment, the landed property of the leper hospital. This parish, with some others, was ultimately incorporated into the union, now known as St. Nicholas's, while Baron Worth's Blue Coat Hospital was built on the site of the church. It is still known as St. Stephen's Hospital.—*Caulfield's Sigilla Ecclesiæ Hibernicæ Illustrata*, pp. 28, 29.

There is much information about the original lands of this hospital, and of those subsequently given to it by Baron Worth, in *Smith's History of the County and City of Cork*, Vol. i. (2nd ed. 1774), pp. 383, &c. The processes of spoliation and family jobbery are splendidly exemplified by the present condition of this institution, which, thanks to the good old system of trustees for corporate property giving perpetual leases at nominal rents to their own friends, enjoys at present only a small part of the revenues which Baron Worth left to it in addition to the leper hospital property.

For the preceding information as regards Cork I am indebted to my learned friend Richard Caulfield, Esq., LL.D., F.S.A., the well-known antiquary, who has also supplied me with further notes respecting leper houses in his native city and county. In a letter to me he says:—"I have just alighted on an abstract of the will of John de Wynchedon, citizen of Cork, executed the Octave of the Apostles Peter and Paul, 1306. This is probably one of the oldest Anglo-Irish wills extant. It is amongst the Roche MSS. in the British Museum. He orders his body to be buried with the Friars of the order of the blessed Augustine of Cork [now called the Red Abbey]. He leaves 200lbs. of wax to be put on the linen to cover his body; [amongst his bequests] 'to the lepers of St. Stephen's, of

St. Mary Magdalen of Shandon; to the lepers near the bridge opposite the Friar preachers [St. Dominick's Abbey, where the mill now is, near the late Cathedral]; to the lepers of Glenawir [Glenmire],' and to other houses."

In the Pipe Roll of Cloyne, which Dr. Caulfield edited some time ago, the following passage occurs:—

"Leprosi de Clone tenent de domino [that is the Bishop], acrem tenæ ubi capella sancti Miehâelis est et tenent per servitium iid. per annum, et per servitia fidelitatis, communis sectæ curiæ."

"The Church of St. Brandon [in Cork] stood on the north side of the river, on one side of the road leading to Youghal, where there is still [says Smith in 1749] a burial ground. The tythes, and a considerable part of the lands of this parish, were formerly appropriated to the maintenance of a leper house."—Smith's *op. cit.*, Vol. i., p. 381. Among the relics, which, Archdall [p. 170] says, "were religiously preserved" in Christ Church in this city, was "St. Patrick's high altar of marble, on which a leper was miraculously carried from Great Britain to Ireland."

I have now endeavoured to record and note on the existence of leper hospitals as follows:—

Armagh.
St. Stephen's, Waterford.
St. Bridgid's, Kilbixy, Westmeath.
St. Stephen's, Dublin.
Lazar's Hill, Dublin.
St. Mary Magdalen's, Wexford.
David le Latimer's Hospital, attached to Hore Abbey—a Cistercian foundation.
St. Bridgid's, at "Hospital," Lismore.
Dungannon, County Tyrone.

[This Sir William Wilde mentions, apparently on authority of Archdall; but I do not find any note of it in his *Monasticon.*]

St. Bridgid's, Galway.
Dungarvan, County Waterford.
St. Nicholas's, Downpatrick.
St. Peter's, Kilclief, County Down.
St. Stephen's.
St. Mary Magdalene's.
St. Dominick's, and
St. Brandon's, Cork, and one more at
Cloyne.

Further researches will probably largely increase this list; and gain information as to the property and discipline of these institutions. Perhaps I should add to it that "In the *Annals of Kilronan*, and of the *Four Masters*, under the date A.D. 1232, we find recorded the death of 'Fachtna O'Halghaith,' Comharb [Vicar] of Drom Muchada, Drumacoo, and official of Ni Fiachrath [the Diocese of Kilmacduagh], a man who kept a house [of entertainment] for strangers, lepers, and for learning and instruction." This is one of the earliest accounts by a contemporaneous writer of an Irish Hospital in Christian times."—(*Wilde, Report on Tables of Deaths*, page 24.) The late eminent Dr. O'Donovan stated that a branch of this "O'Halghath" were also hereditary physicians, and a fragment of a MS. which once belonged to them is still in existence. The name is now Anglicised "O'Halley." The celebrated astronomer, Edmund Halley (ob. 1742), was of this family, as also was the learned Dr. Darbey Halley, Roman Catholic P.P. of Dungarvan, Ardfinan, county Tipperary, who died in 1628.

Long prior to the introduction of Christianity into Ireland, when the regal palaces of Tara and Emania existed, there was attached to the latter "the House of the Crimson Branch," where the warriors of old hung up their arms and trophies, and near to this stood the *Broin Bearg* (or "House of Sorrow") where the diseased and wounded were cared for.—(*Wilde's Report on the Status of Disease, Census*, 1851, page 89.) From the twelfth century to the Reformation, the care of the sick, poor, and the needy was confided to the monastic orders, who seem to have done their work well, according to the ideas and knowledge of their own times. In Dublin we had general hospitals belonging to the Priory of St. John the Baptist, in Thomas-street, with 50 beds, the Steyne, already noticed, Allen's Hospital, the Priory of Kilmainham, and probably others. But all these were suppressed at the time of the Reformation; their revenues were given to greedy courtiers, and their records perished. The clumsy, tax-imposing legislation of our own day is vainly endeavouring to make good to our sick and our poor what the unscrupulous plunderers of a past age selfishly deprived them of. In the sister country St. Bartholomew's and St. Thomas's Hospitals, and a few others, are the only remnants of that true charity for our poor and sick brethren, which the original donors never intended to be used for the foundation of a set of selfish nobles.

ART. V.—*Ascending and Descending Breathing; its Value as a Symptom, and its Mechanism.* By JAMES LITTLE, M.D.; M.R.I.A.; Fellow College of Physicians; Physician to the Adelaide Hospital.

IN 1818 Dr. Cheyne published, in the second volume of the *Dublin Hospital Reports*, the case of a gentleman whose body he had examined, in which the only highly-marked pathological change discovered was conversion of the muscular structure of the right and left ventricles of the heart into fat. Along with other symptoms he noticed, during the last nine days of the patient's life, a peculiar irregularity of breathing; "it would," says he, "entirely cease for a quarter of a minute, then it would become perceptible, though very low; then, by degrees, it became heaving and quick, and then it would gradually cease again. This revolution in the rate of his breathing occupied about a minute, during which there were about thirty acts of respiration." He tells us that he noticed the same description of breathing in a relative of this gentleman, who also died of some disease of the heart, the nature of which he did not know. Other examples of this phenomenon were observed by Dr. Stokes; and as they all occurred in the subjects of fatty degeneration of the heart, he considered it, when present, pathognomonic of that disease. His description will convey to those who have never had an opportunity of witnessing it, more accurately than do Dr. Cheyne's words, an idea of its character. Among the indications of the malady he says there sometimes occurs "a form of respiratory distress, peculiar to this affection, consisting of a period of apparently perfect apnea, succeeded by feeble and short inspirations, which gradually increase in strength and depth until the respiratory act is carried to the highest pitch of which it seems capable, when the respirations, pursuing a descending scale, regularly diminish until the commencement of another apneal period."

After the publication of Dr. Stokes's opinion this form of breathing was considered absolutely indicative of fatty disease of the heart, until 1860, when Dr. Seaton Reid, of Belfast, communicated to the *Dublin Hospital Gazette* a case in which it existed, and in which the muscular fibre of the heart was found absolutely free from fatty change, but in which there were present incompetence of the aortic and mitral valves, dilated hypertrophy of the left ventricle, and dilatation, with atheromatous degeneration of the

aorta and innominata. Dr. Reid also pointed out what had hitherto escaped observation, that during the respiratory distress the pulse became invariably slow, increasing again in frequency during the apnea.

At one of the meetings of the Medical Society of the College of Physicians last year, my friend Dr. Head read a most interesting account of a patient in whom this kind of breathing presented itself in an exaggerated degree, the cardiac change present being aortic patency, with hypertrophy of the left ventricle, without the slightest fatty degeneration of its fibre. He, however, in this case, discovered, and for the first time, as far as I know, described fatty degeneration of the diaphragm.

At the time Dr. Head made his communication to the society there was a patient, a man of sixty-nine years of age, under my care in the Adelaide Hospital, who presented this symptom, the other indications of illness being shortness of breathing on exertion, syncopal attacks, slight incoherence, and general debility. After his death we were only able to secure the heart for examination; its fibres had undergone fatty change, and the organ was small in proportion to the size of the man, but free from valvular disease.

On the 8th of August a coachman, aged seventy-two, came into the hospital, having been ailing for four months with cough and shortness of breathing, to which, two months before admission, succeeded anasarca, at first of the feet and legs, and latterly of the trunk and upper extremities, the urine being scanty, but not albuminous. In his case the respiratory distress was clearly marked; the periods of apnea varying from ten to twelve seconds, while the ascending and descending respirations occupied about thirty-five; the corresponding changes in the pulse, to which Dr. Reid drew attention, were also present. In a note made on the 14th of August, it was recorded that during ten seconds of the breathing period there were only six systoles of the heart, and these were generally irregular in rhythm and force, while during ten seconds of the apneal period there were fifteen, the sounds were indistinct, and with the first a faint murmur could occasionally be heard at the base. He died on the 3rd of October. During the last ten days of his life he spat a good deal of blood, and during the same period this peculiar form of breathing did not exist. We found the left ventricle much hypertrophied, the aortic valves slightly rigid—sufficiently so to offer some obstruction to the outward current, but they were not incompetent; the aorta

itself was studded with atheromatous and calcareous deposit; the lungs contained several large masses of pulmonary apoplexy.

On the 21st of February this year, a pensioner from the Royal Navy, of the same age—seventy-two years—came into the hospital. For the past three winters, he told us, he had had cough and shortness of breathing. During the summer months he had been pretty well, but as soon as the cold weather began this year the symptoms returned, and in the early part of January his feet and legs became swollen. When he entered the hospital he had very little cough and no expectoration, but he could not lie down at night nor speak except very slowly, on account of the little breath he had. On first placing my ear to his back I heard absolutely no pulmonary sounds whatever; but while I continued listening there became audible first a very feeble breath sound; this gradually increased till, as described by Dr. Stokes, it became intensely puerile, with sonorous and sibilant râles, and towards the base of the left lung muco-crepitus, and then in a reverse manner subsided. The respirations were followed by a period of perfect apnea. From a note made two days after his admission I find that the apneal period lasted ten seconds, and during that time nineteen radial pulses were counted. The respiratory acts occupied twenty-five seconds, and during ten seconds counted off at the height of the paroxysm, thirteen systoles were felt at the wrist. The visible impulse of the heart was considerably extended, the apex striking the chest walls beyond the line of the nipple. With the first sound of the heart there was a loud murmur of greatest intensity over the sternum, on a level with the third interspace, traceable downwards towards the ensiform cartilage, but still more clearly upwards in the course of the aorta; it was an unusually prolonged drawling murmur. The patient was universally anasarcous, and his urine contained blood discs and tube casts, and was coagulable to one-third. He died on the 1st of April. For a fortnight before his death it was noticed that the peculiar kind of breathing was no longer present. We found the left ventricle very much hypertrophied and somewhat dilated; the aortic valves were thickened and rigid, but supported a column of water; the entire arch of the aorta was dilated, and its coats studded with atheromatous deposit. I was myself unable to detect any evidence of fatty change in the muscular structure of the ventricles, but I was anxious to remove any doubt by having it examined by some one who was most thoroughly conversant with structural changes; and my friend Dr. MacAlister

was so kind as to do this for me with care, and he pronounced the fleshy portion of the ventricles absolutely free from any degeneration. The kidneys were both diseased.

The clinical fact therefore remains, that breathing of ascending and descending rhythm occurs in fatty degeneration of the heart, and also in cases in which the left ventricle is hypertrophied as a consequence of valvular or arterial disease.

As far as I am aware, those who have attempted to explain this singular condition have either connected its occurrence with weakness of the right ventricle, or attributed it to some perverted action of the nervous centres.

The day I showed at the Pathological Society the heart of the last patient whose case I have referred to, an explanation of the phenomenon suggested itself to my mind; and though it does not, in my own opinion, quite possess all the requirements of a satisfactory solution, it is perhaps a step in that direction.

It occurred to me to ask what do these two morbid conditions under which the symptom has been observed possess in common. In the one the fleshy portion of the left ventricle is atrophied, and has lost almost entirely the endowments of muscular fibre; in the other it is hypertrophied, and possesses to an abnormal degree muscular power, but in relation to the work each has to perform they may be equally incompetent—the fatty ventricle, in consequence of the degeneration of its own structure; the hypertrophous, in consequence of the increased obstacles which are in front of it.

In health the right and left ventricles, though differing so much in the thickness of their walls, are equally competent for their duties, the right is able to fill the pulmonary capillaries as thoroughly as the left, with the aid of the other forces which contribute to the circulation, fills the systemic; but if an abnormal burden is imposed on the left, if rigid valves narrow its outlet, or permit the blood it discharges at each systole to fall back into its cavity, or if the arterial coats, their elasticity destroyed by disease, no longer help the heart, if the aorta instead of taking charge of each wave of blood as it leaves the ventricle, and propelling it onward by the steady recoil of its walls, is permanently dilated, and allows each portion of blood to remain in its ascending trunk, and so to impede the entrance of that which follows—under any of these conditions the left heart, however hypertrophied, may be quite unable to rid itself of the blood as rapidly as it is supplied to it

by the right ventricle. Blood would, therefore, accumulate in the left auricle, in the pulmonary veins, and in the capillaries of the lungs. That blood, having already absorbed as much oxygen as it required, would fail to produce that impression on the ultimate filaments of the pneumogastric which black blood does, and which impression is converted by the nervous centres into the motor impulse which produces breathing. Breathing would, therefore, cease, and inasmuch as the respiratory act seems to assist in carrying the blood to the left side of the heart, it would no longer be so over-stimulated by fresh supplies, and its contractions would become less frequent and more regular. After a few systoles, however, it would succeed in discharging the red blood collected in its cavities to such an extent that they could receive some of that which lay in the pulmonary veins and lungs. Space being thus gained, the black blood which the pulmonary artery contained would reach the capillaries of the lungs in amount proportionate to that of the arterial which had gone forward, and sufficient air would be drawn into the chest to ærate so much blood. That very act would carry forward a still larger charge of arterial blood to the left side, and make room for the reception, by the lungs, of a still further increase of venous blood, and, as a consequence, a still deeper inspiration would follow, and the deepest would occur when the largest quantity of venous and the smallest quantity of arterial lay in the lungs. The red blood, reaching the left heart, would excite it to those frequent and irregular contractions which accompany the respiratory distress, but frequent and irregular they would be also ineffectual, red blood would begin again to accumulate in the left heart, the pulmonary veins, and the lungs, till at last their capillaries would contain little else, and the exciting cause of inspiration, the venous blood, being no longer present, the act itself would again cease.

Precisely similar conditions might, it seems to me, be supplied by fatty degeneration, for if it were—as I believe is often the case—somewhat more advanced in the left than in the right ventricle, or if, in addition to fatty degeneration, disease of the valves or atheromatous deposit in the aorta were present, the balance between the two sides of the heart would be destroyed. In Dr. Cheyne's original case, indeed, it is mentioned that the aorta was studded with steatomatous and earthy concretions.

In the two last cases I mentioned that the ascending and descending breathing ceased during the ten days preceding death,

and that on examination the lungs were found in the one case filled with masses of pulmonary apoplexy, and in the other compressed by pleural effusion; and it is not, I think, unreasonable to suppose that the obstructions thus created to the passage of blood through the lungs may have so weighted the right ventricle that it no longer possessed an advantage over the left, and the balance between the two being thus restored, the conditions necessary for the phenomenon were no longer present.

It is also worthy of notice that there is no feeling of oppression on the part of the patient during the apnea, a circumstance which, I think, favours the idea that the lungs are at the time filled with oxygenated blood; all the distress is felt while the respiratory acts are being performed. The weak point in the explanation I have mentioned lies in the fact that in most cardiac lesions there is a tendency to a similar stasis of blood in the lungs from obstruction on the left side of the heart, while this form of breathing is of very rare occurrence, it may, I think, be suggested that in the cases in which it is manifested the lesion which has destroyed the balance between the two ventricles has been rapidly produced, while in other cases it has taken place so gradually that, in virtue of the tendency in the several parts of the system to work in harmony, the right ventricle has come to send on the blood only at a rate at which the left can receive and propel it.

In Dr. Cheyne's case, though for some years the patient had been in failing health, there seems reason to suppose that the cardiac mischief took place almost with acuteness. In the three cases recorded in this paper, from the first development of symptoms referrible to the heart, to their termination, only a few months elapsed, while in ordinary valvular disease, following an endocarditis, it is frequently years before the changes have become so great as to compromise life, and while they are in progress the action of the two ventricles may become gradually adjusted, not indeed by the supervention of structural change in the right, but by its nervous centres sending to it only so much force as will keep it working in harmony with the left.

At one of the meetings of the Medical Society of the College of Physicians, when I offered this explanation, Sir D. Corrigan drew attention to the reservoirs for arterial blood provided in diving animals, which enable them to store up a quantity of it to supply the oxygen required in the nutritive changes in their bodies while respiration is suspended, and suggested that the left heart and the

pulmonary veins, during the apneal period, performed an analogous function in these cases.

At the same time Dr. Grimshaw mentioned a very interesting observation, which seems confirmatory of the explanation I offer. Dr. Grimshaw had taken several sphygmographic tracings of the pulse in Dr. Head's case, already alluded to. In that patient there existed permanent patency of the aortic valves, and he noticed that the tracings taken during the breathing period exhibited markedly the collapsing pulse of that lesion, while tracings made during the apneal pause showed no such character, a circumstance which, on my theory, would find its explanation in the extreme loading of the left cavities with arterial blood at that time preventing the returning wave falling into the ventricles, as it ordinarily does in aortic insufficiency.

ART. VI. — *History of Two Cases of Hermaphroditism.* By SAMUEL J. WOODS, M.D., Medical Officer of the Roscrea Union Workhouse and Roscrea Dispensary.[a]

THERE are at present in our workhouse two very interesting cases of abnormal development of the sexual organs, considered as male and female, in children of the same family.

The first subject, who has hitherto been regarded as a girl, is aged thirteen years, and presents nothing particular in her general conformation. She is rather good-looking, intelligent, modest, and without the slightest appearance of masculinity.

She was brought under my notice by her mother, for a tumour in the left labium pudendi, and which she stated had made its appearance about one month previously. On examining the parts, and separating the labia, I found that there was no vagina, but there is an apparently well-developed clitoris, having a slight indentation on its glans, with a prepuce, but no nymphæ. Below it there is a funnel-shaped depression, lined with mucous membrane, capable of containing a hazel nut, and leading to a small orifice, through which she micturates. From this, backward to the perineum, the labia are united, forming a deep groove. The left labium is larger than the right, and each contains what appears to be a testis, or ovary, with a trace of cords. The right testis is very high towards

[a] Read before the Dublin Obstetrical Society.

the inguinal region; it requires a good deal of manipulation before it can be felt, and is much smaller than the left. It is likely that the latter may have occupied a similar position previous to the time when the tumour presented itself visibly, and attracted the mother's attention, it only then having descended to its present place.

On mentioning to the mother this condition of her child, she was much alarmed, and said there was something wrong also with her little boy, whom she had with her in the infirmary, and whom I had daily opportunities of observing—the woman being a wards-maid in this department of the institution nearly since her admission, nine months previously.

This child is four years old. He is large for his age; his abdomen protuberant; his legs, arms, and thighs soft and round, and containing a large amount of fat; yet he is not more feminine in his appearance than boys of his years.

On a first glance, when exposed for examination, the external parts of generation have all the appearance of a female. I may say nearly the same description answers for him as for his supposed sister. In place of a scrotum there exist the outlines of the labia pudendi united at the mesial line, without the deep groove as in his sister, but forming a commissure extending to the perineum. Each side contains a very small rudimentary testis and cord; and he also urinates through an orifice at the base of his elementary penis.

On a uterine sound, and also a catheter being introduced, they passed into the bladder; but the finger in the rectum failed to detect any intervening canal, uterus, or prostate gland. On those occasions the "clitoroid penis" in the elder child seemed to possess erectile properties.

Besides these two children the mother has had ten others, of whom six are living—five males, and one female, all well formed. I questioned her closely as to her having had any previous knowledge of the elder child's state, but she declared firmly she had not the least idea of it up to the appearance of the tumour. She was aware of the deficiency in the younger one, as the medical gentleman who attended her in her confinement had informed her of it.

These children present good specimens of doubtful sex, and as such I have thought it right to bring them before the profession. Records of similar instances are scattered through the works of different medical writers. Dr. Beatty, Sir James Simpson, and others have given ample descriptions of them. Dr. Beatty, in his

Contributions to Medicine and Midwifery, has devoted an entire article to them, in which, following Sir E. Home, he divides them into four classes, viz.:—

I.—Malformation of the male.

II.—Malformation of the female.

III.—Males with such a deficiency of the organs that they have not the character and general properties of the male, and may be called neuters.

IV.—Where there exists a real mixture of the organs of both sexes, although not sufficiently complete to constitute the double organ.

I think the elder child may be fairly ranked in the first class, while the younger corresponds more closely in all respects and characteristics to the third class.

I shall soon lose sight of these children, which I regret. It would be desirable to watch the development of the sexual instincts and desires as they grow in years, and to see in what direction they may tend. Doubts have been raised as to the capability of individuals of this kind possessing or exercising procreative powers; but instances have occurred, where previously none were supposed to exist, but where subsequent events proved it to be otherwise, as the following case will show. The description would be ludicrous, if it were not for the sad fate of the hapless wight whose history it relates.

"In the year 1459, there was a bairn which had the kinds of male and female, called in our language a *scarcht*, in whom man's nature did prevail. But because his disposition and portraiture of body presented a woman, in a man's house of Linlithgow (Scotland) he associated in bedding with the goodman's daughter of the house, and made her to conceive a child; which being divulgate through the country, and the matrons understanding the damsel deceived on this manner, and being offended that the monstrous *beast* should set him forth as a woman, being a very man, they got him accused and convicted in judgment for to be burnt quick for this shameful behaviour."—*Prescott's History of Scotland*, quoted by Beck.

These *lusus naturæ* are, and ever will be, inexplicable. Physiologists assert that up to a certain period of intra-uterine life the sexes are not to be distinguished. Then the genitals begin to unfold themselves, and each sex to be discernible. Nature, as in a freak, stops short the growth of these parts, while the rest of the body progresses to perfection; and at the appointed time, the child comes into the world with these organs "just half made up," to be

a puzzle to the medical jurist, whose opinion is frequently required to define the position and status which persons of this description should occupy in the animal economy, and who is called upon and expected to clear up all doubts. In barbarous ages they were regarded as outside the pale of humanity, and their lives were directed to be sacrificed for the common weal—in fact they were considered monsters, and treated as such.

The accompanying wood engravings, from photographs by

Robinson, will convey an accurate idea of the condition of those children whose peculiar malformation I have endeavoured to describe. While the elder child was being photographed, the pseudo-penis appeared somewhat turgescent, from being handled to expose it for portraiture.

Fig. 1. Diseased Elbow-joint.

Fig. 2. Joint after Excision.

Fig. 3. Diseased Bones removed by Excision.
(Life size)

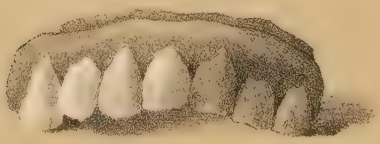


Fig. 4. Seven Artificial Teeth (set in Gutta Percha) removed from windpipe by Incheolomy.

ART. VII.—*Contributions to Operative and Preservative Surgery.* By HENRY GRAY CROLY, Fellow and Licentiate of the Royal College of Surgeons in Ireland; Licentiate of the King and Queen's College of Physicians; Surgeon to the City of Dublin Hospital; Lecturer on Clinical Surgery, &c.

PART I.

I.—EXCISION OF THE ELBOW-JOINT BY A SINGLE INCISION—SUCCESSFUL, WITH PERFECT USE OF THE LIMB.

II.—RESECTION OF THE HEAD OF THE RADIUS—SUCCESSFUL RESULT.

PART II.

I.—WOUND OF RADIAL ARTERY NEAR THE WRIST—LIGATURE OF THE VESSEL—SUCCESSFUL.

II.—WOUND OF THE PLANTAR ARCH—LIGATURE OF THE POSTERIOR TIBIAL ARTERY—SUCCESSFUL.

III.—WOUND OF THE ULNAR ARTERY AND NERVE—LIGATURE OF THE VESSEL—SUCCESSFUL.

IV.—GUNSHOT WOUND OF THE HAND AND WRIST—PALMAR ARCH WOUNDED—ULNAR ARTERY AND MEDIAN NERVE SEVERED ABOVE THE WRIST-JOINT—ACUPRESSURE—RECOVERY, WITH A USEFUL HAND.

V.—COMPOUND COMMINUTED FRACTURE OF THE METACARPAL BONES OF THE LEFT THUMB AND INDEX FINGER, WITH WOUND OF THE RADIAL ARTERY, CAUSED BY A CIRCULAR SAW—HEMORRHAGE ARRESTED BY ACUPRESSURE—RECOVERY, WITH A USEFUL HAND.

VI.—GUNSHOT WOUND OF THE THUMB—AMPUTATION AT THE METACARPO-PHALANGEAL ARTICULATION—RECOVERY.

PART III.

I.—REMARKABLE AND CURIOUS CASE OF FOREIGN BODY IN THE LARYNX — SEVEN ARTIFICIAL TEETH (SET IN VULCANITE) HAVING ENTERED THE WINDPIPE DURING A FIT OF EPILEPSY—IMPENDING SUFFOCATION — TRACHEOTOMY PERFORMED — FOREIGN BODY EXTRACTED — DEATH THE RESULT OF A VIOLENT EPILEPTIC SEIZURE.

EXCISION of the elbow-joint is now acknowledged to be one of the greatest triumphs of Preservative Surgery; arms, formerly doomed to amputation as the only prospect of saving life, are in the present day rescued by this valuable resource of art; and, as will be observed

by reference to Case I. in this paper, by a timely operation, aided by judicious subsequent management, the patient will be afforded a useful limb, enabling him to earn his bread.

Case I.—*Excision of the Elbow-joint for Strumous Disease—Recovery, with full power of Flexion, Extension, Pronation, and Supination.*

C. W., aged twelve years, residing in the city, came under my observation in March, 1867, suffering from strumous synovitis of the left elbow-joint; his mother, who accompanied him, said that he was in good health until the month of January preceding, when he received an injury of the elbow by falling on the ice; the joint became painful and swollen after the fall.

On examination I found the elbow-joint flexed, swollen, red, and fluctuating; extremely tender on pressure, especially over the internal condyle; the pulse was quick, and there was general feverishness. I ordered half a dozen leeches to be applied to the joint, and small doses of mercury with chalk, to be taken daily. The limb was subsequently fixed on an angular gutta percha splint to ensure perfect rest.

This treatment was followed by some relief to the acute symptoms. In three weeks a vesicle formed over the internal condyle of the humerus, and soon burst discharging a thin sero-purulent fluid. Quinine mixture was then prescribed, and the ulcerated spot was dressed with lint steeped in cod-liver oil. The patient drove out daily during the spring in a milk-cart to the country, and kept the joint at perfect rest. He continued to take some tonic mixture, and drank plenty of good milk. Nothwithstanding all this, the disease advanced and several abscesses formed around the joint. These were opened from time to time, and discharged an unhealthy fluid. The boy's health became seriously impaired; he perspired copiously at night, and lost flesh rapidly; the joint became much swollen, stiff, and exquisitely painful. He was accordingly, at his own request as well as that of his parents, admitted into the City of Dublin Hospital under my care on the 2nd of May, 1867, on which day a drawing of the limb was taken by Herr Tomsohn (of Forster and Co's.), with his usual accuracy.—(*Vide* Plate I., Fig. 1).

Appearance of patient, and condition of the limb on admission:—Face emaciated and anxious; hectic flush on the cheeks; pulse rapid; profuse night sweats; eyelids tender; left elbow-joint enormously swollen, presenting a conical shapeless mass, which gives an elastic

and a pseudo-fluctuating feel on manipulation and pressure; the tissues are infiltrated, and the integuments present a purplish shining appearance. There are three sinuses over the external condyle; a bright papilla is observed at each ulcerated point, and on introducing a probe a grating is felt in the region of the condyles of the humerus and upper end of the radius and ulna; intense pain is produced by separating the bones by extension, or pressing the bones of the forearm against the condyles of the humerus. The arm and forearm are wasted, and the fingers and hand present an elongated appearance—a characteristic accompaniment of strumous disease of the elbow.

On consultation my colleagues agreed with my view of the case, and it was decided that excision of the joint should be performed, which was accordingly done on the 3rd of June, in the following manner:—

The patient (who had taken, in the morning, an egg with brandy,) was placed on the operation table, and, having been quickly brought under the influence of the "tetra-chloride of carbon," was turned on his side, and the left arm, with the olecranon directed upwards, was grasped firmly by an assistant and steadied. I commenced by making, with a stout scalpel, a single longitudinal incision, about six inches in length, from above the posterior part of the condyles of the humerus, extending over the olecranon process and terminating on the back of the ulna. The periosteum was next divided with a knife used for that special purpose, and was readily detached from the bone with a raspatorium; the soft parts were rapidly dissected and drawn over each condyle of the humerus (especial care being taken to avoid injuring the ulnar nerve, which, by careful dissection, was not brought into view, being drawn with the infiltrated structures *en masse* over the internal condyle with a retractor). The lateral ligaments of the joint were next divided, and by a few cautious touches of the knife, the end of the humerus was freed from the radius and ulna; the articulating surface of the condyles presented a roughened ulcerated appearance, the cartilage having been removed. A narrow bladed saw, with the blade reversed, was applied, and the humerus (above the ulcerated part) was quickly severed from before backwards. The bone on section was found to be firm and sound. The olecranon process of the ulna, and the great sigmoid cavity, with the head of the radius, which were also diseased, were removed in a similar manner.—(*Vide* Plate I., Fig. 3). There was very little hemorrhage; the infiltrated areolar tissue was next removed with a

curved scissors, and the wound was sponged with iced water; no vessel required ligature. The edges of the wound were approximated with iron-wire sutures, and the limb was placed in an angular box splint, with the thumb uppermost. A short splint was placed on the arm to prevent spasms tilting the humerus upwards.

The patient was carried with the "poles and sheet" and placed in his bed in the large ward which opens into the operation theatre. He vomited several times, and was restless for some hours; an anodyne was administered, and an iced lotion was applied to the wound.

June 4—Patient passed a restless night; pulse 120; ordered iced soda-water, and beef-tea. Small doses of opium were given every third hour to quiet the nervous system.

June 5.—Stomach settled; patient slept well; limb lying comfortably.

June 6.—Turpentine enema was administered with O'Beirne's tube.

June 7.—Patient slept well last night; the bowels were acted upon freely by the enema; the discharge from the wound was considerable, and was removed without disturbing the limb, and the parts were cleansed with "Condy's fluid."

June 8—Two of the sutures were removed; warm-water dressing was applied to the wound, the greater part of which has united by the "first intention;" patient continues to take beef-tea, milk, and iced soda-water.

From this date he progressed most favourably, and was soon allowed to sit up in the ward. Cautious passive motion was practised, and the boy was discharged from hospital on the 3rd of July.

I had a photograph taken of him, in June, 1868, by Lawrence, from which the accompanying lithograph has been executed by Herr Tomsohn (of Forster and Co.'s)—(*Vide* Plate I., Fig. 2.) The boy can now flex and extend his forearm on the arm, as well as pronate and supinate his hand; he can play cricket (he was photographed holding a bat in two postions—before the wicket, and with the bat raised to strike the ball); he can wheel a wheelbarrow, and work; his general health is excellent. I exhibited him lately to the pupils at the hospital, when they were assembled in the Operation Theatre to witness some operations. They satisfied themselves as to the result of the case, which many of them watched, with much interest, from the date of the patient's admission until he was discharged from hospital.

Case II.—J. D., aged nineteen years, a native of the county of Kilkenny, residing in Dublin, was admitted into the City of Dublin Hospital (in June, 1864) under my care, suffering from stiffness and disease of the left elbow-joint. He states that ten years previously he had an attack of inflammation in the joint, and since then has not had free use of the limb. He does not recollect having received any injury of the elbow. On examination the upper arm was observed to be wasted, and the elbow-joint partially stiff. There was an ulcerated spot over the head of the radius, and on rotating the hand, the button-shaped head of the bone, stripped of its cartilage, can be seen moving. The rest of the joint appears healthy. The patient having been chloroformed, I made an incision over the diseased part, exposing the head of the radius, and divided the orbicular ligament, and, with a fine saw, removed the head and portion of the neck of the bone; the wound was closed and the arm placed in the flexed position upon a pasteboard splint; cold-water dressing was applied.

The wound healed rapidly, passive motion was practised, to restore the joint to its natural mobility, and the patient was discharged from hospital.

I lost sight of this case, and was lately much pleased to hear from a medical friend that Delaney was in excellent health, and had full power of the joint.

I have since received a photograph, from which the accompanying lithograph was taken.—(*Vide* Plate II., Fig. 2).

Remarks on Excision of the Elbow-Joint.

The selection of cases of diseased elbow-joint suitable for excision is of the first moment.

The extent of disease in the humerus is to be ascertained by careful manipulation of the arm to discover the condition of the periosteum, which, if thickened high up upon the bone, is generally indicative of an amount of disease, prohibiting resection; and in cases where sinuses exist, the surgeon can, by the introduction of the probe, explore the several bones of the joint.

Elasticity of the joint (ascertained by lateral motion, extension, counter-extension, and by pressing the bones of the forearm against the condyles of the humerus) as described in Case I., is indicative of an amount of disease which never can be cured by rest and time; and unnecessary delay in operating, by trusting the resources of nature too long, may, if injudiciously adopted, allow the diseased

action to progress until the case becomes unsuitable for preservative surgery.

Mode of Operating.—There are various methods recommended by operators for excising the elbow-joint; for example:—the H-shaped incision, the T incision, the single long incision. I have no hesitation in giving preference to the last named method, viz., the single longitudinal incision, that which I adopted in the case now reported. It affords ample room, and admits of early passive motion of the joint, so absolutely indispensable in assisting nature to establish a new joint, without the objection of disturbing the wound, which is apt to occur when the H-shaped incision is adopted.

In performing the operation by any of the methods advised, if the surgeon takes care to dissect all the structures between the olecranon process and internal condyle of the humerus, keeping the edge of the knife close to the bone, there is no danger of wounding the ulnar nerve, which, especially in a thickened condition of the soft parts, lies safely imbedded behind, and can be drawn *en masse* in front of the internal condyle, and thus escape injury.

Hemorrhage in this operation is not to be apprehended, but if the posterior ulnar recurrent artery, which is of considerable size, be wounded, or any other branch, it must be secured before closing the wound.

In sawing the bones, the humerus is to be cut first; if on section it is found to be soft, another portion should be removed. The section of the ulna ought, if possible, be made above the coronoid process to leave intact the brachialis anticus tendon; and, similarly, in removing the diseased portion of the radius, the tubercle must be left to preserve the insertion of the tendon of the biceps, and thus maintain the natural strength and movements of the joint.

In using the saw, its back ought to be directed to the brachialis anticus muscle (which forms the floor of the anti-cubital fossa) to protect the brachial artery. This vessel, however, is not likely to be endangered in a skilful operation.

A roughened state of the shaft of the humerus, sometimes observed when the joint is laid open for resection, is not indicative of caries, and must be distinguished from the thickened periosteum above referred to; such an appearance of the bone is likely to mislead inexperienced operators, and cause unnecessary removal of bone, or, perhaps, of the limb.

The infiltrated areolar tissue surrounding the joint ought to be

thoroughly removed by dissection to avoid the prolonged suppuration which would otherwise eventuate.

Passive motion of the elbow must be early adopted to insure mobility and assist nature in the formation of a new joint, as well as with a view of preventing ankylosis.

Part II.

WOUNDS OF ARTERIES IN THE VICINITY OF THE WRIST AND FOOT, ILLUSTRATED BY SIX CASES.

Wounds of the arteries in the vicinity of the wrist, palm of the hand, and sole of the foot, are of frequent occurrence, in consequence of the exposed position of the blood-vessels in those regions; the hemorrhage is often alarming, owing to the free anastomosis of the blood-vessels, and may threaten life if not arrested with promptitude. John Bell, in his able discourse on wounds of arteries near the wrist, says:—"If I do not mistake the importance of this accident, it is a sort of duty to explain it to you still further; for, though the operation of tying the radial or ulnar artery does not range in the catalogue of important operations along with the trepan and amputation, yet, if I be not deceived, it is more difficult than either, and certainly more frequently required."

Case I.—*Wound of the Left Radial Artery, half an inch above the Wrist-Joint—Ligature of the Vessel—Recovery.*

A. B., aged fifty-six years, a slater, was working on the roof of a stable, when a portion of the rotten wood-work gave way; he fell through the roof to the ground and was stunned. He was conveyed immediately to the City of Dublin Hospital. I saw him soon after his admission, and observed an incised wound running obliquely across the course of the left radial artery, about half an inch above the wrist-joint. The brachial artery was at once compressed, and the patient carried up to bed in the Accident Ward.

By proper treatment he soon recovered from the effects of the "stunning." The pressure having been taken off the main artery, the blood came *per saltum*, which proved that the radial artery was wounded. The wound having been dried with a sponge, I observed a slit in that vessel, nearly a quarter of an inch in length (evidently produced by a broken slate), and, in order to secure the artery above and below the wound, I found it necessary to open on a director, upwards and downwards, the fascia which covers that vessel. The artery was then detached, and a bent eye-probe passed

beneath it, armed with a double ligature; the probe having been withdrawn, and the loop divided, the two ligatures were separated, and the artery tied above and below the slit. The edges of the wound were approximated with strips of adhesive plaster, and a roller bandage was applied; the hand was placed upon a pillow. The ligatures came away in a week, and the man left the hospital in a few days, with the wound perfectly healed.

Case II.— *Wound of the Plantar-Arch—Ligature of the Posterior Tibial Artery—Recovery.*

J. W., aged twenty-two years, a ship-carpenter, in dealing a blow on a piece of timber, the adze slipped, and struck him on the sole of the foot, cutting through his boot and inflicting a severe wound five inches in length. Bright blood flowed freely from the wound; his boot was removed, and a handkerchief was wrapped around his foot; he was conveyed at once to the City of Dublin Hospital.

On his admission the resident pupils made pressure on the femoral artery, in consequence of the alarming hemorrhage, and applied a compress of lint to the wound, and a roller bandage. I was immediately sent for, and having removed the compresses, which were stained with bright blood, I sponged out the wound, but could not see any bleeding vessel, as the cut was very deep. I plugged the wound with lint steeped in turpentine, over which I laid a compress, and placed a compress over the posterior tibial artery in the calcaneo-malleolar space, and another over the anterior tibial artery, and then applied a roller-bandage firmly from the toes. The limb was elevated. In a few seconds (the pressure having been relaxed off the femoral artery) the blood flowed freely from the wound. I therefore proceeded to tie the posterior tibial artery behind the inner ankle as follows:—A semi-lunar incision was made through the integuments, about two and a half inches in length, a thumb's breadth behind the internal malleolus; the three layers of fascia were divided on a director, and the artery, which was carefully separated from its accompanying veins, was ligatured by means of an aneurism needle. Pressure was then taken off the femoral artery, and not a drop of blood escaped from the wound, which was sponged out, and its edges gently approximated with strips of adhesive plaster; opium was prescribed.

The ligature separated on the fifth day; the wound in the sole of the foot healed up quickly, and the patient was discharged from hospital.

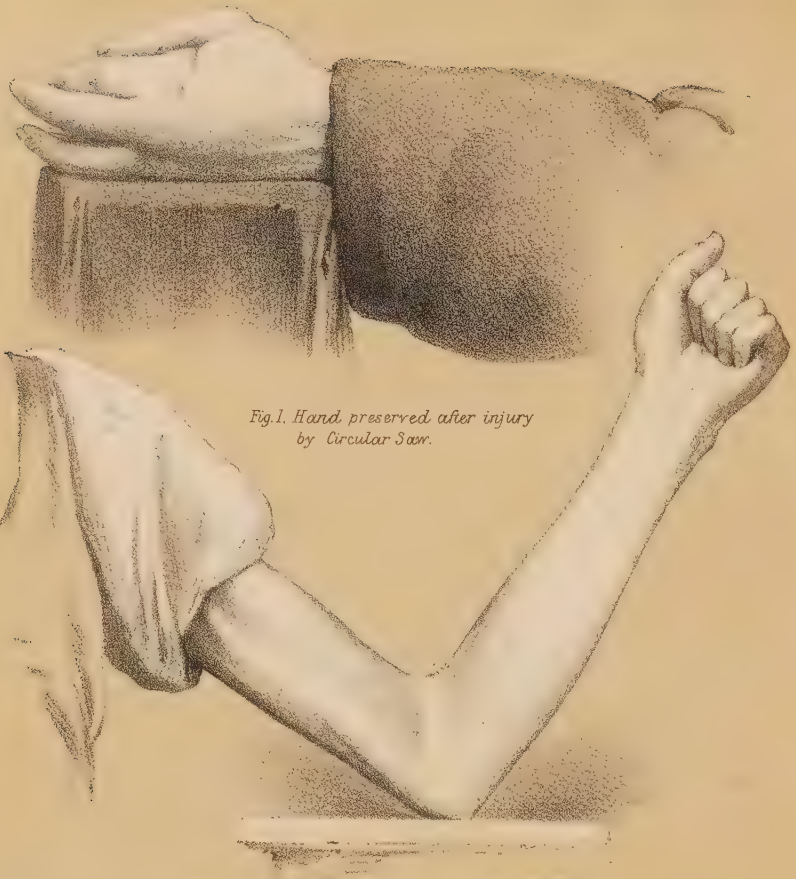


Fig. 1. Hand preserved after injury by Circular Saw.

Fig. 2. Elbow-joint after partial Resection.

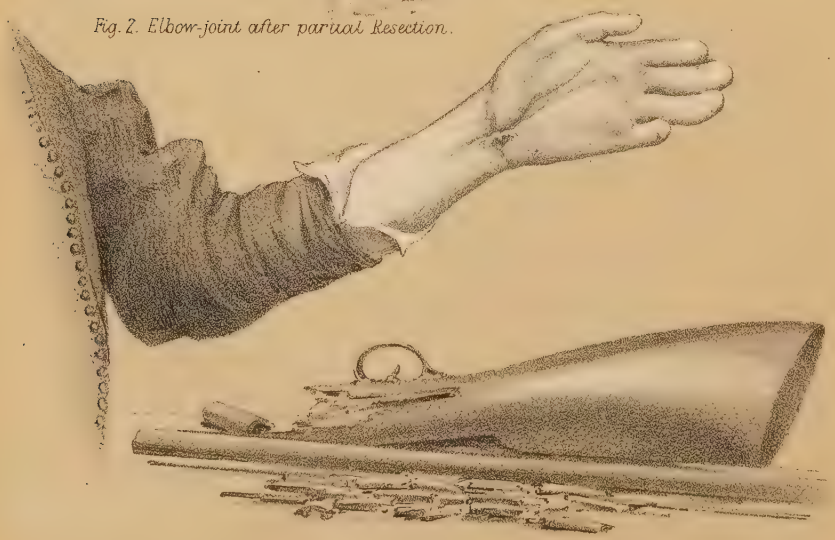


Fig. 3. Hand preserved after Gunshot.

Case III.—*Wound of the Right Ulnar Artery and Nerve—Ligature of the Vessel—Recovery.*

J. P., aged seventeen years, was working on the roof of a house, helping a plumber. His foot slipped, and his leg went through the skylight. He put out his right hand to save himself from falling, and received a severe wound across the wrist from a broken pane of glass. The blood spouted with violence; a handkerchief was tied tightly around the wrist, and he was conveyed at once to the City of Dublin Hospital.

On admission pressure was applied to the brachial artery; and on examination I ascertained that the ulnar artery and nerve were completely divided. I secured the upper end of the artery in a forceps without difficulty; but the distal end retracted beneath the fascia; this I divided freely on a director, and I was thus enabled to secure the lower end of the vessel. The edges of the wound were brought together with iron-wire sutures, a compress of lint was applied, and a roller bandage. The patient was placed in bed, and an opiate administered. On the following day he complained of much pain in the little finger and half of the ring-finger. On the fifth day the ligature separated from the cardiac end of the artery; and on the eighth day from the distal extremity.

On the fourteenth day the patient was discharged from hospital, the wound having perfectly healed. He presented himself amongst the extern patients in a fortnight subsequently, and said that sensation had returned to the ring-finger, but not to the little finger.

Case IV.—*Gunshot Wound of the Palm of the Hand and Wrist—Severe Hemorrhage from the Palmar Arch—Ulnar Artery and Median Nerve Wounded—Vessels Ligatured in the Palm of the Hand—Ulnar Artery Acupressed—Recovery, with a Useful Hand.*

M. F., aged seventeen years, page to a gentleman residing a few miles from the city, was out shooting with a double-barrelled gun, which was loaded heavily with snipe shot; in firing the gun, the barrels burst, and inflicted a severe wound of the palm of the hand, wrist, and lower part of the forearm. The hemorrhage, which was profuse and arterial, was controlled temporarily by pressure applied to the brachial artery, and the patient was conveyed as quickly as possible to the hospital.

I saw him almost immediately after his admission, and found him in the following condition:—He was partially collapsed, and complained of intense pain.

Restoratives were administered, and on removing the dressings I observed an extensive lacerated wound extending from the junction of the lower with the middle third of the forearm to the centre of the palm of the hand. The muscles protruded, and several divided tendons were hanging loosely. The anterior annular ligament was completely severed, and the median nerve divided; the radial and ulnar arteries were exposed. I examined the wound carefully for the purpose of ascertaining if any wadding or portion of the gun had entered the hand, but could not discover either. The patient was now placed in bed, and a full opiate administered.

As soon as reaction became established, and pressure was taken off the brachial artery, several branches of the palmar arch bled. I secured each by means of the artery forceps, and applied a fine ligature. Having removed all the clots with a small sponge and stream of cold water, I proceeded to make careful pressure in the palm of the hand in the following manner:—

A small bit of lint which was steeped in a solution of perchloride of iron was fitted accurately into the bottom of the wound, from which there was a general oozing of bright arterial blood; and then a larger piece of lint was laid over the first, and so on until a graduated compress was formed; the palm of the hand was carefully padded with flat compresses to prevent blood being extravasated beneath the palmar aponeurosis. Before proceeding further I was obliged to amputate the ungual phalanx of the little finger, as that part was comminuted. I next applied the gauntlet bandage of Genga to each finger separately, and also to the thumb, and placed compresses on the back of the wrist to exercise pressure on the dorsal carpal arteries, as suggested and successfully practised by Mr. Adams, of this city. The fingers were placed on the palm, and fixed in that position with a view of relaxing the palmar fascia, which, if on the stretch, would tend to keep open the mouths of the vessels, and favour hemorrhage.

Having discovered a wound in the ulnar artery about two inches above the wrist, I secured it by passing an acupressure needle under it (carefully avoiding the ulnar nerve), and a loop of inelastic iron-wire over it; all hemorrhage was thus fully arrested. Oblong compresses were applied over the radial and ulnar arteries, and a roller bandage was evenly adjusted as far as the bend of the elbow. A roller was also placed transversely in the antecubital fossa, and the forearm was flexed on the arm; the battle-dore splint, properly padded, was applied to the hand and forearm to give sup-

port, and the limb was elevated. The anti-tetanic pills of the late Robert Moore Peile, of this city, were prescribed as follows:—

℞ Aloës hepaticæ.
Pulv. antimonialis ā ā gr. xij.
Opii. pulverizati, gr. iij.
Syrupi q. s.
Ut fiant pil. xij equales—duæ ter die sumendæ.

A full opiate was administered each night; the patient took ice, beef-tea, and wine. The acupressure needle was withdrawn on the third day, without any disturbance of the bandages. There was no return of the hemorrhage, and the wound healed gradually. The tip of each of the first three fingers was destroyed by gangrene, which fortunately did not spread. The boy remained nearly three months in hospital, and was then discharged. He has resumed his occupation as page; can attend table, and make good use of his hand.

A photograph of the patient was taken by Lawrence, showing the hand and gun, and the accompanying lithograph by Herr Tomsohn.—(*Vide* Plate II., Fig. 3.)

Case V.—*Compound Comminuted Fracture of the Metacarpal Bones of the Left Thumb and Index Finger, with Wound of the Radial Artery, caused by a Circular Saw—Hemorrhage arrested by Acupressure—Wound Dressed with Carbolic Acid—Recovery, with a Useful Hand.*

E. D., aged seventy years, a boatman, incautiously put his hand under a circular saw to pull out shavings. The saw caught his hand, and almost completely severed his thumb and forefinger. He was conveyed at once to the City of Dublin Hospital, and I saw him immediately on admission (as I happened to be in attendance on the engine-driver and stoker who were injured by the serious accident at Bray Head on the same morning). On examination I observed the thumb and index finger lying in the palm of the hand, held in front merely by the flexor tendons and integument. A fearful wound presented itself, extending from the groove which separates the ball of the thumb from the palm to the dorsal surface of the second metacarpal bone. Arterial blood flowed freely, when pressure was taken off the brachial artery, which an assistant had charge of. I sponged out the wound, and tied several small muscular branches of the radial artery. The main vessel was

wounded in the deep space between the metacarpal bones of the thumb and index finger, where it dips in to form the deep palmar arch, and was secured by passing a long, slightly-curved acupressure pin beneath it, and a loop of inelastic iron-wire over it, being an example of the fourth method of acupressure.

The hemorrhage was thus fully controlled, and I next proceeded to examine the fractured metacarpal bones. That of the thumb was broken obliquely in two places near its centre. I placed the fractured portions in apposition, and having made a suitable gutta percha splint, I applied it to the under surface of the thumb, so as to give it steady support. The metacarpal bone of the index finger was also comminuted, and I was obliged to remove one loose piece. The index finger was strapped to the second finger; the hand was then fixed on a well-padded battle-dore splint. Carbolic acid oil and ointment were applied to the wound. The anti-tetanic pills were prescribed, and a liberal allowance of beef-tea, wine, and ice. The acupressure pin was removed in twenty-four hours, and the wound again dressed with carbolic acid ointment. The case progressed most favourably, and the patient was discharged from hospital in six weeks, and attended as an extern patient to have his hand dressed; he is able to oppose the thumb and forefinger, and has a useful hand. The accompanying lithograph (taken from a photograph) shows the present condition of the hand.—(*Vide* Plate II., Fig. 1.)

Case VI.—*Gunshot Wound of the Thumb—Amputation performed at the Metacarpo-Phalangeal Articulation—Hemorrhage arrested by Acupressure—Stump Dressed with Carbolic Acid Ointment—Recovery.*

C. H., aged twenty-five years, groom to a nobleman near the city, was out shooting. He placed his thumb on the top of one of the barrels of the gun; the breech was on the ground. From some unknown cause the gun went off, the shot carrying away the ungual phalanx of the right thumb. The patient lost a considerable quantity of blood, and was brought to the hospital as soon as possible.

I visited promptly on receiving the accident-notice, and found him partially collapsed. On examination the ungual phalanx of the thumb was seen hanging loosely. The bone of the proximal phalanx was shot away, and a portion of jagged integument connected the distal phalanx with the hand. With a small scalpel I removed the thumb, and made flaps sufficiently large to cover the

end of the metacarpal bone. The vessels were acupressed, and the wound was dressed with carbolic acid. The anti-tetanic pills were prescribed. The patient suffered much pain in the thumb and up the arm for several days. The wound healed gradually, and he was discharged from hospital. He is able to drive and groom a horse, and has very good use of his hand.

The treatment and successful result of the foregoing cases will justify the following practical remarks on this important department of surgery:—When the radial or ulnar artery is wounded near the wrist, the proper treatment to be adopted is to tie the bleeding ends, or to arrest the hemorrhage by acupressure or torsion. If necessary the wound should be previously enlarged along the course of the vessel, and the fascia which covers it must be also freely divided on a director, as the wounded artery is very liable in this region to retract under the fascia. The highest surgical authorities advocate the ligature in preference to any other mode of treatment. John Bell in his Surgery says:—"The radial artery is one of that order and size which cannot be restrained but by the ligature;" and also adds, "There is no safety in trusting to compression, sponges, or astringents, for you are yourselves never free from anxiety, nor your patients from danger. The blood bursts out again and again, and all those intervals of expectation and those apparent successes only increase the difficulties of the case. To temporize is cruelty, not mercy." Cases are also recorded in Bell's Surgery in which loss of limb and even of life itself resulted from trusting to pressure instead of the ligature. The following interesting and instructive case occurred in the practice of our celebrated countryman O'Halloran:—

"A butler to a gentleman in wiping a glass happened to break it, and received a considerable wound of the wrist, in which the radial artery was divided. It bled violently, and with some difficulty was mastered by Mr. White. The bleeding returned in two days, again in five, and thus continued bursting forth at times, on the least motion of the hand, for near a month. This great loss of blood having greatly fatigued and weakened the patient, on a consultation with the late Mr. Gould, amputation of the arm was resolved upon, and performed on the very next return by Mr. White, in the presence of Dr. Martin, and the man soon recovered, but was rendered incapable of service."

If pressure be resorted to in wounds of the radial or ulnar arter

near the wrist instead of securing the ends of the vessel, hemorrhage is liable to occur again and again, and the blood becomes extravasated beneath the fascia into the surrounding areolar tissue, which becomes altered into a placenta-like mass, or like rotten sponge. Inflammation and sloughing result; the artery becomes diseased from repeated attacks of inflammation, and if then sought at the wounded part (a most difficult undertaking), the ends of the vessel which have retracted are in so altered a condition that they will not hold the ligatures, and I feel justified in adding that the successful termination of my cases, as above detailed, was entirely owing to the prompt application of the ligature or acupressure needle, and not by trusting to other resources.

In wounds of the palmar arch if a bleeding vessel can be seen it should be secured; if not, the wound may be cautiously enlarged with the aid of a director, curved near its point, to enable the operator to reach the vessel without injury to any of the other important structures in that region. The practice here differs from that required in a wounded radial or ulnar artery, as pressure when carefully applied in the palm of the hand is often sufficient to arrest the most troublesome bleeding, and should be done in the manner fully detailed in Case IV. If pressure fails, the surgeon must lose no time in adopting the practice first recommended by Liston, viz.: to secure the brachial artery. In wounds of the plantar arteries the treatment which I adopted in Case II., namely, ligature of the posterior tibial artery behind the internal malleolus, is the only practice to be relied on. In wounded arteries, generally, the great rule established by Guthrie and other surgical authorities is to secure the vessel above and below the bleeding point. The following cases, illustrative of the success of this practice, were annually related by the late Dr. Woodroffe in his surgical lectures in the Cork School of Surgery (of which he was the founder), and I am indebted to my father, who was apprentice for five years to that distinguished surgeon, for the notes of the cases. "The Hon. Mr. Deane (subsequently Lord Muskerry) was bled from the arm, and the brachial artery was wounded. Notwithstanding pressure having been applied, the bleeding occurred again and again, and his life being endangered, he was brought to Cork from the county of Limerick, and on a consultation of many surgeons amputation was recommended. Dr. Woodroffe having got permission to try and secure the bleeding ends of the artery, he accomplished the operation expertly, and the nobleman recovered with the full use

of the limb, and the case added greatly to the deserved reputation of that eminent surgeon."

The second case occurred at Spike Island, and is already recorded by Mr. Butcher. "A man wounded the posterior tibial artery as it passes behind and above the inner ankle. Dr. Woodroffe was called in to justify amputation, and, as in the preceding case, succeeded in tying the wounded artery above and below the bleeding parts. This was the means of saving the man's limb, and probably his life."

Tetanus is a well-known and dreaded complication in gunshot or lacerated wounds of the hand and foot (as in Cases III. and VI.) Fortunately none of my patients were attacked by so fatal a complication. The early use of the anti-tetanic pills was probably a preventive in those cases.

Part III.

REMARKABLE AND CURIOUS CASE OF FOREIGN BODY IN THE LARYNX—SEVEN ARTIFICIAL TEETH (SET IN GUTTA-PERCHA) HAVING ENTERED THE WINDPIPE DURING A FIT OF EPILEPSY—IMPENDING SUFFOCATION — TRACHEOTOMY PERFORMED — FOREIGN BODY EXTRACTED — DEATH THE RESULT OF A VIOLENT EPILEPTIC SEIZURE.

At eleven o'clock on the night of the 9th of July of the present year I received an urgent message from Mr. Lyon, of Patrick-street (general medical practitioner), requesting me to visit Mr. ———, a *Dentist*, aged thirty years, residing in Parliament-street, who had missed a set of artificial teeth from his own mouth on recovering from an epileptic fit in the afternoon of that day, and who was then suffering from urgent dyspnea.

Having placed in my pocket the instruments and appliances required for tracheotomy, I drove at once to the residence of the patient and found him sitting up in bed suffering from croupy breathing. In reply to my questions he spoke in a whisper. I ascertained on inquiry from his wife the following facts:—Her husband had been the subject of severe epilepsy for sixteen years. He lost his teeth early in life, and before his marriage had an artificial set put in, which she was in the habit of removing when he was seized with a fit. The clasp of the upper set was broken, and through negligence had not been repaired. He was frequently attacked with epilepsy when in the act of operating as a dentist. He dined heartily

at four o'clock on that day, and at five o'clock had a violent fit; and on recovering could not find the upper set of teeth belonging to the front of his mouth. He felt uneasiness in his throat; lost his voice, and had some difficulty of breathing. He searched his bed and room for the teeth but could not find them, and yet he could not believe that he had swallowed them. His wife sent for Mr. Lyon shortly after the occurrence, who, finding the patient's symptoms becoming serious, requested that I should be sent for. I proceeded to examine the patient in the following manner. I first passed the fore-finger down to the entrance of the windpipe to ascertain if the foreign body lay across the opening. I then examined his chest carefully with the stethoscope, but could not discover any alteration from the natural respiratory murmur. I next drew forward the tongue and introduced a long curved forceps into the larynx; this produced alarming dyspnea; the patient vomited large lumps of meat and potatoes. I informed the patient and his wife that I believed the teeth were lodged in the windpipe, and that an opening should be made without delay into the air-tube to prevent suffocation. I also stated that if he got an epileptic fit while the foreign body lay in the windpipe he might be suffocated.

I had the advantage of a consultation with my able friend Mr. Porter, now President of the Royal College of Surgeons. He agreed with me as to the imperative need for immediate operative interference. In his presence I again attempted to feel the foreign body with the aid of a long curved forceps, but was obliged to desist in consequence of the urgent dyspnea and struggling of the patient. The necessity for the operation was fully explained to the patient and his wife. They agreed to our proposal, and I then proceeded to operate. The patient was placed on his back on a table as near as possible to a jet of gas which was over the mantel-piece. His shoulders were raised, but he suffered considerable dyspnea when his head was brought backwards. His beard having been shortened, and the integument over the trachea steadily fixed, I made an incision in the median line with a scalpel, commencing about half an inch above the sternum, and extending nearly as high as the cricoid-cartilage. The fascia connecting the sterno-hyoid and sterno-thyroid muscles was divided on a director, and then with the handle of the knife and the end of my forefinger I quickly reached the tracheal fascia, which I scraped through with a director. Scarcely a drop of blood was lost. Enormous veins (the inferior

thyroids), almost as large as goose-quills, were seen lying parallel to the trachea; these, with the sterno-hyoid and thyroid muscles, were carefully retracted by Mr. Porter. Having laid bare the rings of the trachea, which was very deep and small, I seized and raised the tube by means of a small hook, and with a narrow-bladed knife I cut a circular piece out of the trachea as large as a sixpence. The dyspnea was relieved, and the air passed through the wound with a loud hissing sound. The windows were thrown widely open, and the patient sat up. I proceeded to search through the wound alternately with my finger, a bent probe, and a curved forceps in every direction, but could not touch the foreign body. This proceeding caused urgent dyspnea. Soon after the patient was seized with one of the worst epileptic fits which I ever witnessed. His face became almost black, and his features were hideously distorted. The air passed freely through the artificial opening during the fit, as evidenced by holding a lighted candle to the wound. The flame was blown out three times in succession. We dashed his face with cold water, and I raised with a hook the opening in the trachea, and kept it raised on a level with the wound. The mucus was carefully removed with a small sponge and feathers. The fit lasted about a quarter of an hour, and we feared that he would have expired in it. He recovered, and I again attempted to find the foreign body. On introducing the end of the little finger I touched a hard substance lying at the left side of the larynx, close above the wound. I tried to seize it in a polypus forceps, but it slipped upwards towards the mouth. I then caught and was enabled to remove the set of artificial teeth. They are represented in the accompanying lithograph. The patient was shortly afterwards seized with another epileptic fit, in which he soon expired.—(*Vide* Plate I., Fig. 4.)

The annals of Surgery afford numerous instances in which foreign bodies of various forms and size have accidentally entered the air-passages—amongst the most remarkable of which are the case of Brunel, the celebrated engineer, in whose larynx a half-sovereign slipped, and which, by a combination of artistic and scientific skill, was happily expelled thirty days after the accident—tracheotomy having been performed by Sir Benjamin Brodie; Houston's case, in which a large molar-tooth entered and passed through the larynx during the operation of extraction; also cases of, buttons, pease, fruit-stones, portions of bone, &c.; but perhaps the case now related has no parallel, in which so large a foreign body as seven

teeth, set in vulcanite, entered the larynx, and passed through the rima glottidis, and lodged at the junction of the larynx and trachea.

That a foreign body had entered the air-passage during a fit of epilepsy was evident in this case, from the croupy breathing, urgent dyspnea and aphonia, corroborated by the fact that the artificial teeth belonging to the upper jaw were missed by the patient after the epileptic seizure, and could not be found. The stethoscopic signs were negative, in consequence of a foreign body having been fixed in the long axis of the trachea (as was afterwards ascertained in the removal of the teeth), and thereby not fully obstructing the entry of air into the lungs.

The necessity for bronchotomy was obvious, and was sanctioned on consultation with Mr. Porter. The danger of spasm of the glottis in this case was imminent and two-fold, either from the foreign body being forcibly driven against the rima glottidis during respiratory efforts or during a return of the epileptic seizure. I accordingly performed the operation of tracheotomy, ably assisted by Mr. Porter.

Such a procedure at mid-night on an epileptic patient, having a fat neck, with enormous large veins and a small and deeply-seated trachea, was a serious undertaking, and, so far as the operation itself was concerned, was perfectly successful. Death was obviously caused by prolonged and violent recurring epilepsy.

ART. VIII.—*The Instantaneous Method of Treating Stricture of the Urethra.—The Perrève-handled and Tunnel-handled Dovetail Stricture Dilators, together with the Dovetail Urethrotome Conductor and Single-bladed Dilator.* By B. WILLS RICHARDSON, F.R.C.S.I., Examiner in the Royal College of Surgeons, and Surgeon to the Adelaide Hospital, Dublin.

IN the *Medical Press and Circular* for April and November, 1867, March, 1868, and in *British Medical Journal* for February of same year, I published illustrated descriptions of some stricture dilators, which, although different in construction, are identical in principle, the forcers of each being formed so as to dovetail with the lower blade. I am indebted to the Messrs. Oldham, of Dublin, the eminent engravers, for the idea of applying the dovetail principle to the dilator. The first design was—to form the conductor like the male part of an ordinary dovetail joint, and attach it by the apex

Fig. 1.—The writer's modification of the original dovetail dilator.

to the centre of the upper surface of the lower blade, extending from the posterior end of the handle to about an inch of the point. And—that the forcer should be hollowed, having a slit along its under part for the passage or free sliding of the neck of the conductor.

It is unnecessary to delay the reader with any further description of that design, as I am informed a dilator cannot be constructed of small calibre according to it, and at the same time have the strength which should be possessed by an instrument for the instantaneous method of forcing urethral strictures. Fig. 1 represents a dilator constructed upon the above-mentioned plan, but with some modifications of mine in the handle and conductor, the latter being round and not triangular as originally proposed.

If the reader will study Figs. 2 and 3 he can scarcely fail to understand the difference between the original design and that of Fig. 1.

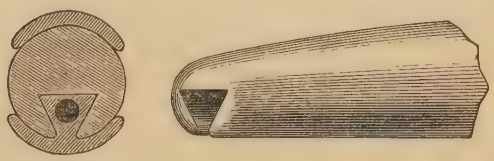


Fig. 2.—Diagrammatic vertical section of the dovetail conductor, forcer, and blades, with separate piece of forcer, of the original dovetail dilator.

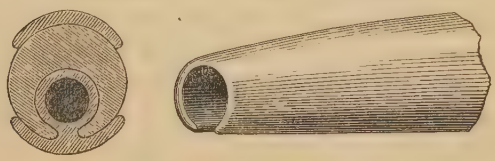


Fig. 3.—Diagrammatic vertical section of the dovetail conductor, forcer, and blades, with separate piece of forcer, of the author's modification of the original dovetail dilator.

Although the dilator delineated in Fig. 1 cannot be made of the required fineness and strength, the design, nevertheless, was the first step in enabling me to perfect a dilator, the tunnel-handled instrument, which, judging by the favourable testimony I have received regarding it, and my own experience of its action, I am induced to consider one of the safest instruments in use, for the instantaneous method of overcoming a stricture of the urethra.

When the positions of the component parts of the dovetail, seen in Fig. 1, are mutually transposed, then a dovetail dilàtor can be made of the necessary fineness, strength, and solidity. An instrument constructed conformable to this plan, was made for me by the Messrs. Weiss, and first described in one of the November numbers of the *Medical Press and Circular* already alluded to. This dilator is wonderfully strong, and of very small calibre for an instrument of the kind, being only No. 2 at the point, thence gradually rises to No. 3, and finally to No. 4 (Weiss' gauge), which it retains to the handle.

Description of the Perrève-handled Dovetail Dilator.

The Dilator (Fig. 4), like Perrève's Fig. H. model[a] (Fig. 5), is composed of two blades soldered together at their vesical ends. Instead, however, of having an oscillating conducting rod, this form of conductor has been dispensed with; and, therefore, when the instrument is in use, it is composed of, viz.:—

(1). The two blades, with their corresponding half-handles.

(2). The two clamps, fixed by screws to the lower half-handle.

(3). The forcer.

The lower blade differs very much from the corresponding blade of the Perrève dilator, which is but slightly grooved for the play of a small portion of the circumference of its conical forcer.

In the dovetail dilator, the lower blade forms the greater portion of a cylinder, and would be complete only for an interspace (Fig. 6) along its upper part, for the passage of the neck of the male dovetail attached to the forcer. Fig. 7 is a diagrammatic section of the forcer and two blades, and shows the relations these parts should bear to each other. The upper blade is slightly grooved to fit the upper margin of the forcer (Figs. 6 and 7).

[a] Traité des Rétrécissements de l'urètre. Emploi Méthodique des Dilateurs Mécaniques dans le Traitement de ces Maladies. Par Victor Perrève. A Paris, 1847. Pl. 3.

Fig. 4.—Dovetail dilator with forcer between the blades. The posterior clamp is not so deep as the corresponding clamp of Perrève's dilator. Perrève used the deep clamp as a point of resistance for his fingers in his method of pushing the forcer home.

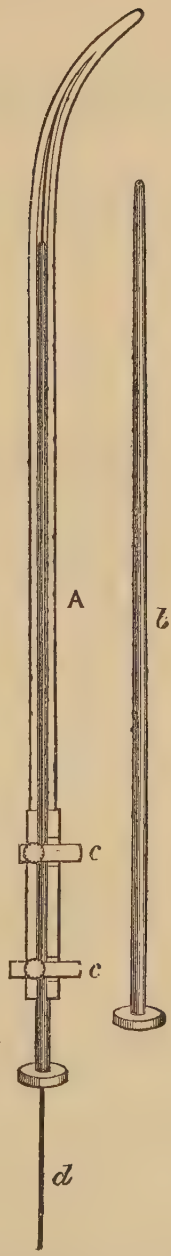


Fig. 5.—A. Perrève's Fig. H Dilator. *c c*—Clamps. *d*—Long conducting rod. *b*—Separate forcer.

In this dilator, as I mentioned in November, 1867, the posterior

part of each blade is soldered in a central groove channelled the whole length of its own half-handle (Fig. 8).

Fig. 6.—Vesicle end of dovetail dilator and of forcer.

Fig. 7.—Diagrammatic vertical section of forcer and two blades. Shows the dovetailing of forcer with lower blade.

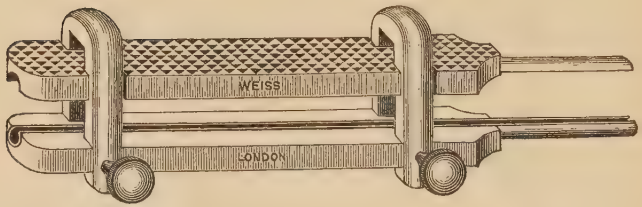


Fig. 8.—Clamped handle of dovetail dilator. The screws are fitted to the right vertical clamp bars, as seen in Fig. 16, copied from Perrève's work. In all his other drawings he represents them in the left vertical bars.

The half-handles are nearly identical with the half-handles of the Perrève instrument (Fig 9). I had them applied to Fig. 8, feeling

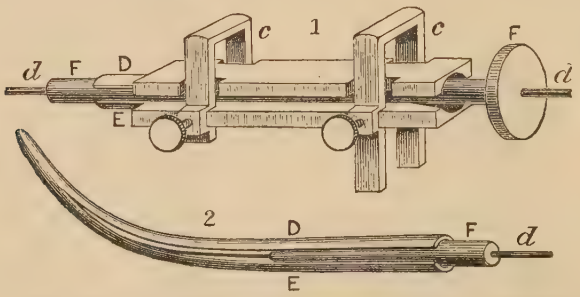


Fig. 9.—1. Handle of Perrève's dilator. *c c*—Clamps. *d d*—Conducting rod. D E—Portions of the blades. F F—Forcer on rod.

2. Vesicle end of Perrève's Fig. H dilator. D E—Blades soldered together at their vesicle ends with *d*, the conducting rod. F—The forcer. Perrève used the same description of handle with all the dilators illustrated in his work.—(*Ibid.*)

that, as they are suitable for the working of Perrève's dilator,

Fig. 10. Dovetail forcer.

they would likewise form a good handle for the dovetail dilator. Further on it will be seen that I have, since the description of Fig. 4 was published, designed a handle better adapted for instantaneous dilatation with the dovetail dilator than the Perrève handle.

The soldered vesicle end of the dilator is traversed by a canal (Figs. 4 and 6), continuous with the grooves in the two blades, which, when grasped by a stricture, form a sufficiently perfect passage for the urine, and thereby enable the surgeon to know when the bladder has been entered.

The Forcer.—The forcer (Fig. 10) may be made of hollow tubing or of solid metal. The latter is preferable. Its shape may be varied, as seen in Fig. 11. I myself prefer the broad forcer, having found the stricture yield at once to its influence, and it is so perfectly secured against any tendency to lateral tilting, by resting upon and partially grasping the lower blade, at each side of the longitudinal slit (Figs. 7 and 11).

Fig. 11.—Vertical sections of forcers, suitable for the double-bladed dovetail dilator. Flat-sided forcers should be deeper vertically than broad ones. The two narrow forcers in the figure are not represented of the proper relative depth.

The flat-sided forcer should have a greater relative vertical depth than the broad one, or it will not produce an amount of dilatation equal to the latter. The groove of the upper blade must be very accurately adapted to, and slightly overlap the upper edge of the flat-sided forcer, as an additional security against lateral tilting. The two sections of narrow forcers in Fig. 11, have not been drawn deep enough to show the proportion they should bear to the broad ones in same figure.

The forcer is not to rise abruptly to its full diameter. The curve of Fig. 12 will, I have no doubt, appear to many of my

Fig. 12.—Vesical end of dovetail forcer, having a different curve superiorly than seen in Figs. 4, 6, and 10. A forcer of this curve scarcely permits of any appreciable space to be formed between its vesicle end and the blades, when it is gliding between them.

readers better adapted for separating the blades than the curve given to my first forcers (Figs. 6 and 10).

The male dovetail is formed along the lower part of the forcer, and should extend from point to handle (Figs. 10 and 11); and be shaped and sized to correspond to the groove and slit of the lower blade, merely allowing of its gliding with facility when the forcer is being pushed home (Fig. 7).

The number of forcers to be supplied with this dilator, and the one I am about to describe, depends upon the requirements of the surgeon. So many, clearly, are not necessary for instantaneous enlargement to full calibre of canal, as for the slower mode of procedure.

I need scarcely say that the forcers and blades should be highly polished.

It appears to me advisable, before describing the tunnel-handled dilator, that I should draw the reader's attention to the mechanical working of Perrève's handle, when forming part of his instrument.

The handle was designed by Perrève, with the chief object of preventing the rod from wriggling, when it is conducting the forcer between the blades. The tendency to wriggle may, to a great extent, be obviated by the combined influence of the clamps (Fig. 13),

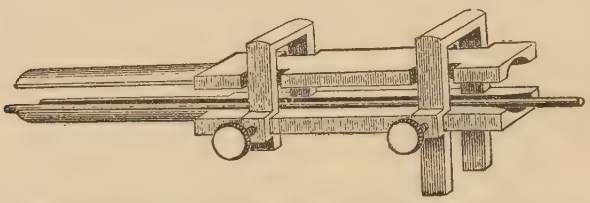


Fig. 13.—Clamped handle of Perrève's dilator, with portion of conducting rod between its two halves. A little of each blade is also seen.

half-handle grooves, and finger-pressure of the surgeon, provided it is sufficiently firm to prevent the forcer and rod from slipping

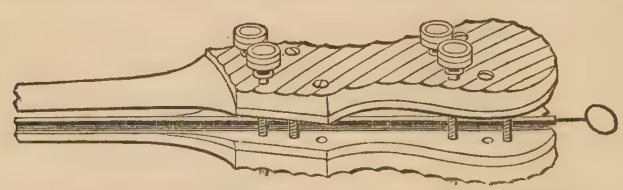


Fig. 14.—Mr. Holt's handle for the Perrève dilator, as represented in the second and last edition of the former's memoir on the immediate treatment of stricture of the urethra. In this handle steady pins are used, instead of Perrève's steady clamps, for maintaining the half-handles in proper relation to each other.

out of the grooves. If the half-handles are not energetically pressed towards each other when the forcer is in the grooves, there will be great risk of the conducting rod buckling, particularly when the forcer is being pushed quickly home. Pressure, however, of the Perrève half-handles and their modifications (Fig. 14), is a

Fig. 15.—Diagrammatic vertical section of conducting rod, forcer, and blades of dilators on the Perrève principle. Shows the risk of the forcer slipping from between the blades, if the conducting rod deviates from its central position. Compare with Fig. 7.

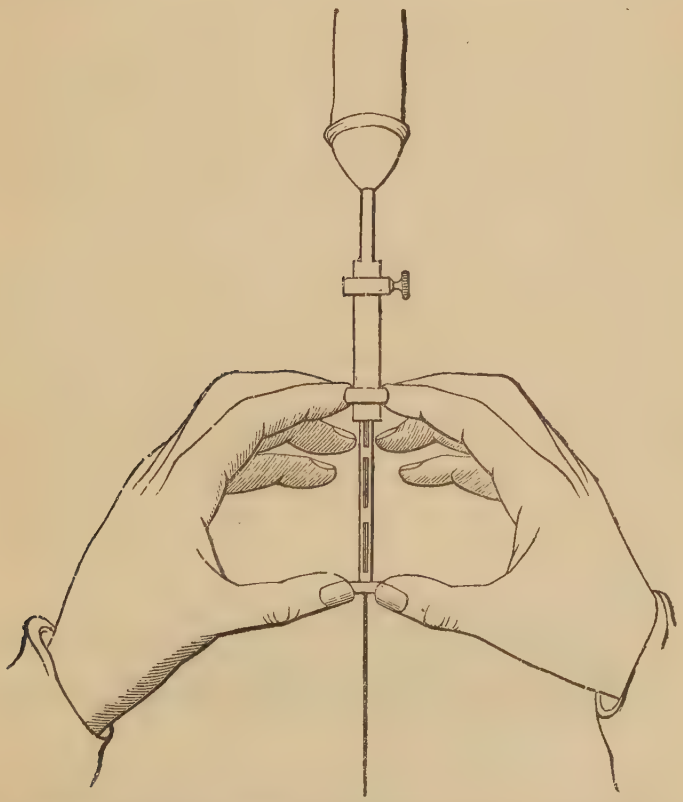


Fig. 16.—Perrève's ordinary mode of using the dilator. Copied from p. 173 of his work.

great obstacle to rapid gliding of the forcer, and, the greater the stricture resistance, the greater the pressure required to maintain the rod and forcer in a central position between the blades.

Fig. 15 will assist those readers not familiar with dilators constructed on the Perrève principle, in understanding why the rod is in danger of buckling, if allowed to deviate from its central position when the forcer is passing along it. Of course the chances of the rod bending or buckling, are not so great when the forcer is used according to the slow method Perrève so frequently followed (Fig. 16); but, if it is driven home with great rapidity, then, indeed, the half-handles must be steadily pressed towards each other, or the consequences may be most disastrous.

After numerous trials of the Perrève-handled dovetail dilator, I satisfied myself that the forcer is so securely retained in a central position between the blades, from dovetailing with the lower one, that, as far as safety is concerned, firm pressure of the half-handles is altogether unnecessary, and therefore we might get rid of a great drawback to its swiftly sliding. Indeed, the dovetail dilator may be securely worked, without any pressure of the forcer, when it is passing through the handle. This was a most important point to have ascertained, and enabled me to substitute for the Perrève handle, one which allows the forcer to act against the stricture, almost, if not altogether, instantaneously.

Albeit, pressure of the forcer through the intermedium of the handle is unneeded; it appeared to me that a handle, in which screw pressure could be applied to the part of the upper blade which plays in it, might be advantageous, by allowing the blades to be pressed together during the passing of the dilator. With this intention I designed a tunnelled handle, which permits of pressure of the handle portion of the upper blade being applied to a nicety

Fig. 17.—Tunnelled handle of double-bladed dovetailed dilator. In this handle the upper blade is prevented going forward with the forcer by being somewhat T shaped posteriorly, whereas in the Perrève handle the same result is obtained by the playing of the clamps in the notches of its upper half.

by means of two screws. This handle (Fig. 17), does not allow of any finger pressure of the forcer by means of the upper blade (Fig. 18), which should be so proportioned to the inside of the tunnel to

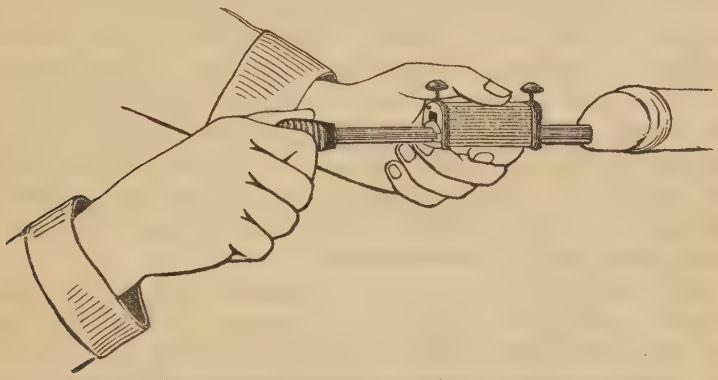


Fig. 18.—Method of using the tunnel-handled double-bladed dilator.

allow of free, but not too free, vertical play (Fig. 19). Being T shaped posteriorly it is prevented going forward with the forcer, by

Fig. 19.—Part of upper blade which plays inside handle, with part of blade anterior to handle.

the playing of the arms of the T against the corresponding uprights of the arch of the tunnel.

The posterior end of the lower blade is soldered in a groove formed for it the whole length of the tunnel.

The tunnelled handle made for me by the Messrs. Weiss, is wrought in steel and silver, the ends and floor of the arch being formed of the first material, the remainder of the latter; but silver is not essential for its construction.

The aperture for the urine to enter the dilator may be made to run through its point as in Fig. 4, or to open on the convexity of the curve.

When the beak of the dilator is bulbed (Fig. 20), its introduction

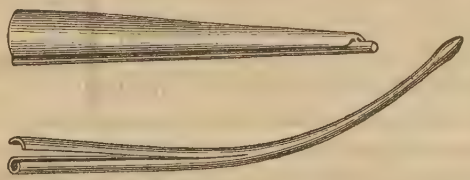


Fig. 20.—Vesical end of forcer, and bulbed end, of double-bladed dovetail dilator. The opening for the urine is not seen in the figure.

is greatly facilitated, particularly when there is more than one stricture. The curve should not be too abrupt; in fact, the dilator ought to be nearly straight.

In my description of the tunnel-handled dilator, in March last, I stated that its bulbed end could be fitted with either a long or short movable gum-elastic guide, by means of a screw arrangement, the bulb being hollowed for the reception of the male screw, attached to the guide. One of Perrève's drawings represents a somewhat similar arrangement. I have since then found, that a modification in the mode of using Desault's guide, catgut being substituted for metal, answers all the purposes of the above more expensive gum-elastic one.

If a piece of prepared catgut, of suitable size, and three or four inches longer than the dilator, be passed through the dovetailed canal of the lower blade, until it projects about an inch from the beak, it will form a very useful guide in difficult cases (Fig. 21).

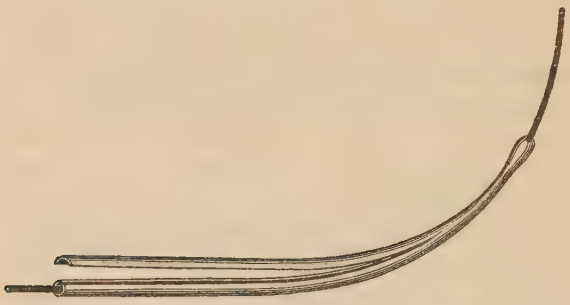


Fig. 21.—Vesical end of dilator with catgut guide projecting from the bulbed point. It may be remembered, that Dr. Hutton was in the habit of sliding the catheter into the bladder over his catgut guide previously introduced into that viscus, whereas, according to the plan suggested in the text, the guide and dilator are both passed together.

It is almost superfluous to observe, that the opening for the urine must be in the point of the dilator, to enable the surgeon to avail himself of such assistance, and that the catgut is to be withdrawn when the bladder has been entered.

Forcers similar in form may be used with both the Perrève-handled and tunnel-handled (Fig. 22) double-bladed dilators, but I prefer the broad forcer, also, for the latter dilator.

The Perrève-handled and tunnel-handled dovetailed dilators are both made by the Messrs. Weiss, and are kept in stock by Fannin & Co., the Messrs. Weiss' agents in Dublin. The tunnel-handled

instrument, however, is so complete in every respect, it is the one I recommend.

The Dovetail Urethrotome Conductor and Single-bladed Dilator.—A conductor, similar in principle to the lower blade of the double-bladed dovetail dilator, makes an excellent and safe director for the urethrotome, the latter being adapted to the single blade (Fig. 23), by the aid of a male dovetail.

If the urethrotome sheath and conductor are properly fitted to each other, the groove of the latter will pilot the urethrotome to a stricture with precision and safety. The dovetail conductor is, therefore, free from the risk incidental to the use of many of the instruments designed for cutting strictures from before backwards. The conductor made for me by the Messrs. Weiss has a tunnel handle (Fig. 23), and is of small size, being only $1\frac{1}{2}$–2, and 3 (Weiss' gauge), from point to handle. But, if the point is made bulbous (Fig. 24), this part will be more than $1\frac{1}{2}$ of same gauge. The conductor, in the same manner as the double-bladed dilator, can be furnished with either the gum elastic or the catgut guides, for pioneering the blade in difficult coarctations.

There is attached to the lower edge of the urethrotome sheath, a male dovetail, adapted for gliding along the groove of the conductor. It is of sufficient size to prevent it from rising out of the groove (Figs. 25, 26, 27).

The lower edge of the cutting blade is likewise dovetailed (Figs. 25 and 26), so that, when sheathed, its dovetail appears to be continuous with that of the sheath (Fig. 27). By dovetailing the knife with the conductor, it is maintained in a perfectly central position when dividing a stricture.

In the posterior steel arch of the handle of the conductor there is a screw (Figs. 23 and 24), for rendering the sheath immovable as the blade goes forward.

In order to ascertain if the stricture has been completely divided, the knife is to be retracted within its sheath, the handle screw reversed for a few turns, and the sheath is then to be pushed forward, towards the bladder.

The dovetail conductor can be used as a dilator, but is not suited for such rapid action as the double-bladed dilator, when the stricture will only allow a No. 4 bougie to pass it. But if more dilated, say to No. 6 or 7 (Weiss' gauge), the forcer may then be driven quickly home.

Fig. 22.—Double-bladed tunnel-handled dilator, with forcer between the blades.

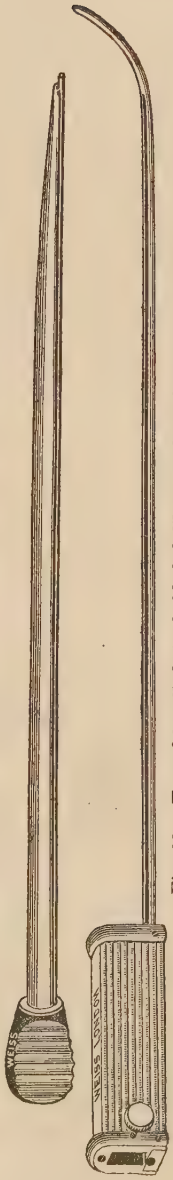


Fig. 23.—Tunnel-handled single-bladed dilator and urethrotome conductor.

Fig. 24.—Bulbed tunnel-handled single-bladed dilator and urethrotome conductor. The forcer is represented a little too long.

Fig. 25.—Dovetailed urethrotome sheath and blade.

Fig. 26.
Urethrotome
protruded.

Fig. 27.
Urethrotome
sheathed.

A few weeks ago, having dilated with bougies to No. 6, an obstinate stricture of the anterior part of the urethra of J. S——, a patient in the Adelaide Hospital, who had another stricture at or near the bulb, I rapidly enlarged the former with the single blade and suitable forcer, to No. 13 (Weiss' gauge). I did not operate on the posterior coarctation, fearing that, as the man had a large lumbar abscess, injurious results might follow the forcing of the perineal portion of the urethra. No unpleasant consequences whatever, followed the forcing of the anterior stricture, which might be used as an argument in favour of dilators, particularly as the first use of bougies with this man, some months previously, was immediately followed by most severe symptoms, resembling those of blood-poisoning. The left claviculo-scapular articulation suppurated during the attack.

The posterior stricture yielded with facility to ordinary gum elastic instruments. The man is now in the country, and occasionally passes No. 12 bougie for himself.

Figs. 23 and 24 show the shape of forcer essential for the single blade. Four forcers, at least, should be supplied with it, viz.:— Nos. 4, 7, 10, and 13 (Weiss' gauge). It is most important that their increase in calibre from before backwards should be very gradual (Figs. 23 and 24), that they may enter the stricture and not push it before them.

I by no means wish it to be thought, that I consider the single-bladed dilator calculated to supersede the double-bladed instrument. I designed it at the outset for a urethrotome conductor, when the idea also struck me, that if the forcers are formed as I have mentioned, it could, in careful hands, be used as a slow dilator,

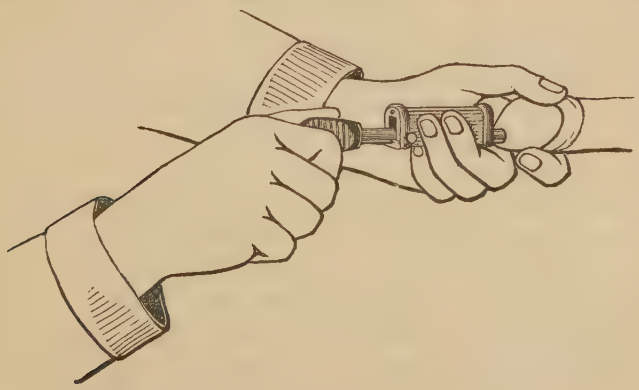


Fig. 28.—Method of using the single-bladed dilator.

provided care is taken to hold firmly both the glans penis and handle (Fig. 28), while the forcer is entering and dilating the stricture. For, should the glans be not fixed and kept well forward, the stricture will most probably recede before the wedge and not be penetrated.

The case of J. S.—— proves that it may be used for rapid dilatation.

The urethrotome and single-bladed dilator are likewise kept in stock by the Messrs. Fannin.

[Since this paper was sent to press, I received the following note, with case, from my friend Dr. Cruise, whose observations I value most highly, knowing that he is eminently qualified for appreciating the mechanism of the dilator]:—

"3, Merrion-square, West,
"*July* 11*th*, 1868.

"My Dear Mr. Richardson,—I send you a brief note of the case of stricture which I dilated some time ago, with your instrument.

"The case is no ways special, but being an old, hard, tight contraction, fully tested your dilator.

"I have no hesitation in stating that, in my opinion, your instrument is superior to any other hitherto devised for forcing strictures—superior to Perrève's original dilator, and to Holt's modification thereof. Its action is perfectly smooth, its safety absolute, and—thanks to the novel handle—it is most convenient in use.

"The case is as follows:—

"R. W——, aged thirty-two, entered the Mater Misericordiæ Hospital, under my care, March 13th, 1868. His principal suffering at the time of admission arose from an abscess in the scrotum, which had formed close to a fistulous orifice through which nearly all the urine habitually passed. Since the formation of the fistula, a sequel of perineal abscess, dating two years back, scarcely any urine had passed through the penis. The original stricture was of eight years' duration, and followed a severe gonorrhea.

"I immediately opened the scrotal abscess, kept the patient in bed for a couple of days, and poulticed, &c.

"On exploring the urethra, I discovered a tight contraction, about four inches from the glans. With some difficulty, I got in No. 2 wax bougie, and, after a few days, succeeded with No. 3. As the

stricture was hard and gristly, I determined to burst it, and, accordingly, introduced your dilator, March 24th, 1868. Having done so, I passed in the largest sized forcer, with the greatest ease, and then withdrew the instrument. I directed for the patient a warm hip bath, some quinine with opium, and abstained from introducing any instrument for two days. At the end of this time I passed, *with facility*, a No. 10 gum elastic catheter. The patient never manifested an untoward symptom.

" From the time when I dilated the stricture the perineal fistula commenced to close, and soon contracted to a mere pinhole. I detained the patient in hospital for two months after the operation, in order to watch his progress. At the end of that time the fistula gave no trouble, and No. 10 catheter was passed with the most perfect freedom.

" Should you wish to publish this case, I need hardly say you are quite welcome to do so. Meanwhile, I remain,

" Dear Mr. Richardson,

" Faithfully yours,

" F. R. Cruise.

" B. Wills Richardson, Esq.,

" North Frederick-street, Dublin."

[Within the last few days Messrs. O'Neill and Thompson, of Henry-street, Dublin, forwarded to me for approval, some specimens of the dilators and urethrotome, which, they state, were made on their premises. These instruments are excellently shaped, well constructed, and highly finished.]

Art. IX.—*On the Postural Treatment of Prolapse of the Funis.* By George H. Kidd, M.D., F.R.C.S.I., Assistant Master Coombe Lying-in Hospital, Dublin.

Notwithstanding the very numerous methods that have been suggested for the management of prolapse of the funis, it must be admitted that we have not yet achieved any great success in the treatment of this complication of labour, seeing that the average result is the loss of more than one-half of the children, and that even in the most experienced hands the success is not much greater.

I do not mean, however, to enter into the statistics of the sub-

ject at present, or even to canvass the merits of the several plans of treatment that have been recommended, but rather to direct attention to the method of which Dr. Thomas, of New York, published an account in 1858. This method is briefly described in the late editions of Churchill's "Midwifery," but I cannot find that either in Ireland or England cases have been recorded in which it has been practised, though three very excellent papers have been published on the subject by our Scotch *confrères*.

The method has one thing to recommend it beyond most others, viz., that it is easily accomplished, and adds nothing to the risk of the mother, and may be tried at a period when most of the others are quite impracticable, and its failure does not prevent the subsequent adoption of any other plan.

The mechanism of this method of treatment may be most clearly apprehended by first considering the mode in which the displacement most frequently takes place.

When a woman is in the erect posture, the axis of the gravid uterus is downwards and backwards, and consequently, if the funis be long, it gravitates to the lowest part of the uterus, and if the liquor amnii escape suddenly, may very readily be carried through the os with this fluid. When the woman lies on her back, or on her side, though in less degree, the cord has still a tendency to fall through the os uteri; and, when this accident occurs, if we attempt to replace the prolapsed portion, when the woman is in either of these positions, we almost always find that as quickly as we push up one

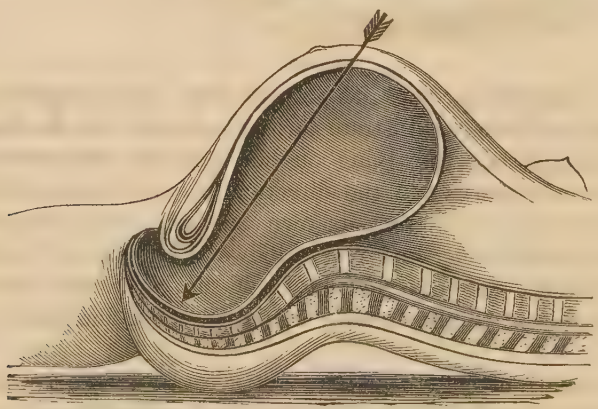


Fig. 1.

loop, another comes down, owing to its own weight, its natural lubricity, and the inclined plane formed by the uterus. Now the

postural method reverses this inclined plane, by making the fundus the lowest part of the uterus, and thus makes the natural gravitation of the cord and its lubricity assist us to replace it, instead of being the chief obstacles.

To effect this, the patient is placed on her knees and elbows, with her shoulders as much depressed as possible, and her head down on the bed. In this position the cord has a tendency to roll into the uterus instead of out of it, and if the membranes be unbroken, this position will often, of itself, suffice for the replacement of the cord; but, if the waters have escaped, it may be necessary to push up the head, and carry the cord up with the hand till it is free of the head, and can slip back into the uterus. A pain or two now borne in this position brings the head to fill up the os, and so prevents the cord again falling through.

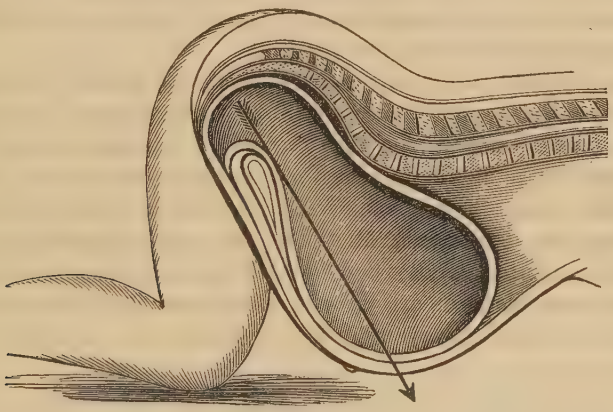


Fig. 2.

The accompanying diagrams, copied from those originally published by Dr. Thomas, illustrate this very clearly. In the first, the woman is supposed to be lying on her back, and the arrow shows the axis of the uterus and the direction in which the cord would have a tendency to fall from its own gravity. In the second, the woman is placed on her knees and elbows. The axis of the uterus is now reversed, and both the weight of the cord and its lubricity favour its descent to the fundus, in the direction indicated by the arrow.

In the month of December last, I was asked to see a woman in labour of her second child, as the funis had prolapsed and was still pulsating. The waters had escaped early in the labour. I found the os dilated about an inch in diameter; it was hard, rigid, and

unyielding, with about six inches of the cord hanging out of it in a loop, and still pulsating; the head was presenting, and the pains were slow, inefficient, and irritating.

It was evident that version or the use of the forceps was out of the question, and that to replace the cord was the right mode of treatment; and, as I had but little faith in the other methods of doing this, I resolved to give the postural plan a trial; I accordingly placed the woman as Dr. Thomas recommends, and was greatly pleased to find the cord almost at once return into the uterus, and, on my gently raising the head, pass from out of reach of the finger altogether. The woman remained in this position till she had three pains, after which I allowed her to lie down. Labour proceeded slowly, but the cord did not again pass out of the os; and, at the expiration of fourteen hours, a living and healthy child was born—a result altogether due, I believe, to the adoption of the postural method of treatment.

In this case the cord lay in front of the head, that is, between the head and the anterior lip of the uterus, and I believe this accounts, in some degree, for the ease with which the prolapse was reduced. The condition of the os contributed to this also, that is, its not being fully dilated, and its not embracing the head; but in the following case which I saw lately, under the care of Dr. Ringland, these conditions were reversed, and it was necessary to introduce the hand into the vagina, to accomplish the replacement of the cord.

A woman in labour of her fourth child was admitted into the Coombe Lying-in Hospital on Saturday, 4th July. On examination it was found that the membranes were ruptured, that the os was fully dilated, and the head about to pass through it and enter the brim, and that about twelve inches of the cord had escaped out of the uterus, between the head and the posterior lip, and formed a considerable coil in the vagina, and was still pulsating. Having placed the woman on her knees and elbows, Dr. Ringland and I both attempted to reduce the prolapsed cord by pressing back the head with a finger placed in the vagina, but could not succeed, whereupon Dr. Ringland, keeping the woman in the same position, passed his whole hand into the vagina, with the determination to turn the child if he could not get the cord replaced. This, however, was not necessary, as he found he could now carry the prolapsed cord into such a position that it slipped back into the uterus when he made slight pressure on the head, and thus, though the woman

had to suffer the pain of having the hand introduced into the vagina, she was saved the still greater pain and the great risk of having it introduced into the uterus for the operation of version, and the child was placed in the state of greatest possible safety instead of one of extreme danger.

The woman remained in this position till she had two or three pains, when she was allowed to lie down, and in an hour afterwards she was delivered of a living child, and though it died on the third day after its birth, the success of the operation was complete and satisfactory.

Though we are indebted for our present knowledge of this mode of treatment to Dr. Thomas, with whom the idea seems to have been original, it appears from certain researches recently made by Dr. K. F. J. Birnbaum, and of which a sketch is given in the *New York Medical Journal* for January, 1868, that frequent mention has been made from time to time by authors of the advantages to be derived from posture in the management of cases of prolapsed funis. Thus Kiestra recommended, in 1855, essentially the same procedure, but speaks of it as the revival of an old treatment long ago recommended by Camper and Deventer. To Camper's works, published in the middle of the seventeenth century, he had not access, but he describes Deventer as treating of the entire subject of prolapsed funis *in extenso* in a work published in 1701, and specially desiring the midwife, when the cord is pressed against the pubes or sacrum, to place the woman on her knees, with her body thrown forward, and the accoucheur to then raise the head and return the cord. Two English authors—Mowbray in 1724, and Bracken in 1737—gave similar advice, and Ludwig Wilhelm von Knœr, in 1747, and George Daniel Bœssel, in 1756, recommended that the woman should be placed on her knees during cephalic or podalic version, to prevent protrusion of the cord. Van Ritgen, in 1838, also recommends the patient to be placed on her hands and knees, and states that this sometimes succeeds without any manipulation; and Theobold, in 1860, "considered the most favourable condition for the return of the funis was to place the woman upon her head, but in view of the difficulty attending the execution of this manœuvre, compromised the matter by suggesting the position on the elbows and knees."

PART II.

REVIEWS AND BIBLIOGRAPHICAL NOTICES.

RECENT RESEARCHES ON THE PATHOLOGY OF TUBERCLE.

Etudes sur la Tuberculose. Preuves Rationelles et Experimentales de sa Specificité et de son Inoculabilité. Par J. A. Villemin, Professeur agrégé a l'Ecole Impériale du Val de Grace. Paris: 1868. J. B. Baillière et Fils.

Studies on Tuberculosis; Rational and Experimental Proofs of its Specificity and Inoculability. By J. A. Villemin, &c.

The Nature and Affinities of Tubercle; being the Gulstonian Lectures for the Year 1867. By Reginald Southey, M.D., Oxon.; Fellow of the Royal College of Physicians; Assistant Physician to St. Bartholomew's Hospital; late Radcliffe Travelling Fellow. London: 1867. Longmans.

On the Inoculation of Animals as a Means of Diagnosis in Tubercular Phthisis. By W. Marcet, M.D., F.R.S.; formerly Assistant Physician to St. Bartholomew's Hospital—*Medico-Chirurgical Transactions*, 1867.

The recent researches into the nature and production of morbid structures which have been, and continue to be, pursued with great energy and zeal, have led to a complete reinvestigation of the whole subject of tubercle, and have opened up a number of questions which seem likely to lead to some important modifications in the views hitherto generally held. Always regarded with the interest which its immense importance naturally excited, the intrinsic difficulty of its study made real progress so slow and so embarrassed that it might almost be said that no important advance in the pathology of tubercle had been made from the time of Laennec till the publication of the remarkable researches of Virchow.

This consummate observer, who has almost changed the entire face of pathology, has given an account of the mode of its formation, which is now generally adopted, in all its essential parts at least, by pathologists, and which differs widely from that taught by Laennec or by Rokitansky.

As Virchow's teachings are still not familiarly known in this country, we propose to allude briefly to some of the more important points in his general pathological doctrines which bear more especially on the subject of tubercle, and with which some acquaintance is necessary to the comprehension of his views with regard to that morbid substance.

The fundamental doctrine of the cellular pathology, of which Virchow is the originator and exponent, may be said to be embraced in a few propositions which are capable of being briefly and intelligibly stated.

The ultimate active elements of the organism are cells. By these the tissues are originally formed, and by these the vital operations in the fully-developed body are carried on. They are susceptible of great varieties in shape and in size; the amount of inter-cellular substance between them may be considerable, or the reverse; they may undergo modifications so great as to render their original cellular character no longer recognizable; yet they constitute the basis for all the phenomena of life.

Every cell must be derived from a pre-existing cell—*omnis cellula e cellula*—and the theory of blastemata, and of free cell-formation of Schleiden, and the molecular theory of Bennett, are alike devoid of foundation.

Every cell possesses an independent life of its own; its nutrition may be impaired or increased; its development and reproduction may be variously influenced; but it possesses an individual existence and action—an autonomy—which is its special attribute.

Not only is it from the cell that all the normal or physiological tissues are formed, but it is from the cell that all pathological growths are derived—in fact the cell is the element whence all structures in the body, whether in health or in disease, are originated.

The connective tissues of the body are the source whence the great majority of pathological new formations are produced. These tissues, which comprise the areolar, the fibrous, and the elastic tissues, as well as the animal basis of bone, cartilage, the neuroglia, mucous tissue, and others, which, in fact, form a continuous framework for the entire body, contain an abundance of cellular elements—the

connective-tissue corpuscles—which may be regarded as the common stock of germs for the body.

If we have clearly in our minds the idea of the independence and individuality of the cell, we get rid of the notion of a central source whence the operations of the economy are set in motion, and we get a clearer conception of the true relations of the nervous system to the rest of the organism. Formerly, everything which took place in the body was referred to nervous influence or to vascular action. According to Virchow, neither nerves nor vessels have the slightest direct influence either on healthy nutrition or on the development of morbid structures. They are only of importance in so far as they regulate or furnish the supply of nutrient material which is necessary to build them up. In support of this important proposition illustrations and arguments are drawn from a vast range of physiological and pathological facts, of which we can only notice a few.

Embryology has shown that the growth and development of parts can take place without nerves, antecedently, even, to the formation of the nervous system at all. Vegetable physiology has taught us that processes analogous to those which are observed in animals go on in plants without the possibility of the intervention of nerves; that morbid swellings are formed as the result of injuries to the bark or to the leaves of trees, which in their mode of origin closely resemble those which are found in the animal body; and we have learned, from the remarkable experiments of Paul Bert, that even a portion of an animal, after having been completely separated from the body, can enter into direct vascular connexion with the body of another animal, can be nourished by it, can grow at its expense, and can in all respects become an integral part of its body.

The same conclusion as to the independence of the cell is arrived at from a consideration of various pathological facts which have been adduced by Virchow. Diseased actions, for example, go on in parts altogether unprovided with nerves in exactly the same manner as they are found to occur in parts which are supplied with nerves, evidently as a result of the action of the individual elements of the parts concerned.

It will be readily understood, from what has been already said, that according to the cellular pathology there can be no morbid structure or product which is not the result of cell action of one kind or other. The vital energy of the cell may be perverted, may

be altogether destroyed; but as long as it does exist it is a definite thing beyond which, in our explanation of pathological processes, we find ourselves unable to get. Again, every pathological formation must be derived, at its beginning, directly from a physiological tissue, and this enables us easily to comprehend how it is, as microscopic researches conducted by many of the most competent observers have shown to be the case, that every pathological tissue has a physiological prototype.

There can, accordingly, be no heterologous tissue in the body in the sense in which heterology was understood by Laennec—namely, as a character of structure, distinctively morbid, and to which nothing analogous exists naturally in the system. What does occur with regard to pathological formations is that a structure may be formed at a place where it ought not—Heterotopia; or a time when it ought not—Heterochronia; or to an extent which is unusual or incompatible with the purposes of the organism—Heterometria. Every morbid growth, then, is formed on some model which had previously existed in the economy. Colloid growths can be referred to the histological type of the umbilical cord; pus globules are perfectly similar to the colourless corpuscles of the blood; cancroid resembles epithelium; enchondroma is constituted like cartilage; and even cancer and tubercle, long regarded as unquestionable examples of heterology, have analogies with other structures formed in the body. The word heterologous is applied by Virchow to morbid structures which do not reproduce the type of the part where they are found, but present some other type of formation; and it is only in this restricted sense that he employs the term.

As new formations are produced at the expense of the elements of a part, it follows that the elements from which they are derived must cease to exist; and accordingly every kind of new formation possesses, as far as the normal structures are concerned, an essentially destructive tendency. There is no such thing as a deposit of morbid material additional to the original anatomical elements of a part, and deposited between them; no blastema, or aplastic or cacoplastic lymph substances, so long regarded as essential to the formation of diseased structures.

A point of essential importance with regard to the discovery of the real nature and affinities of a morbid structure is, that it should be subjected to examination at the most suitable time for the recognition of its character—namely, at a period before it has

begun to experience the degenerative changes which accompany decay, and on the other hand not before it has attained a sufficient stage of development to enable it to present its distinctive characters. It is from neglecting this precaution that pathologists have been led into error with regard to many new formations, and specially with regard to tubercle.

When we come to examine what is the cause which leads cells to deviate from their natural course of reproduction, and to give birth to the aberrant and misshapen structures which are found in disease, we feel at once that we are entering upon dangerous ground. Virchow tells us that it is owing to a peculiar irritation. A certain excitation, he tells us, is necessary for the production of any vital act. Action is necessary to produce reaction. It is from some error in this irritant or excitant, some excess in amount or in degree, or some abnormal character, that morbid instead of healthy reaction is induced. This is the Reiz, which in the system of Virchow plays so important a part, and which can only be regarded as a plausible hypothesis to account for the facts which are observed.

These preliminary observations will make the account to be given of tubercle more intelligible. If a small semi-transparent tubercular granulation from a serous membrane be subjected to microscopic examination, we find that it contains a number of different elements. In the centre is a mass of granular debris giving evidence of degeneration, and containing molecules of fatty matter, and amorphous bodies with some inter-cellular substance. As you examine in the direction of the circumference cells are seen, some with only one, some with a considerable number of nuclei contained in them, and quite at the circumference of the growth are cells closely resembling the connective-tissue corpuscles, from which they only differ in having a greater size and in containing more nuclei.

The explanation of this is as follows:—The connective-tissue corpuscles under the influence of some morbid irritation begin to proliferate with unusual rapidity, the process beginning at the part which ultimately becomes the centre of the nodule; new generations of corpuscles become rapidly developed, and the irritation extends from the central point to the neighbouring parts; soon by the rapid divisions which the cells undergo they come to press upon each other, and not only interfere mutually with their development but obliterate the little vessels which supply them with nourish-

ment, and as a necessary result themselves degenerate and decay. So that the little mass may be said to consist of three concentric zones representing different stages of development—an external zone, in which the cells depart but little from the normal type, and exhibit the earliest and slightest evidences of the abnormal excitation; a middle zone, in which they are proliferating rapidly; and, finally, an inner, consisting of nuclear bodies and amorphous elements, which may be regarded as the final product of the degenerative multiplication of the elements, and of the mutual pressure to which they have been subjected.

It is by this process of degeneration, so induced, that the cheesy material is produced which was so long regarded as the characteristic form of tubercle; nor is it difficult to see how the error arose. When yellow cheesy masses were found in the lungs, and in other organs of phthisical patients with great regularity, and when grey granulations were met with, which were evidently undergoing a transformation into a similar material, it was natural to suppose that the yellow tubercle was the characteristic form of the morbid product; and when, on microscopic examination, this substance was found to exhibit amorphous bodies, evidences of degeneration, absence of vessels, and other marks of an undeveloped substance, observers were not unnaturally led to regard tubercle as mere deposit from the vessels, incapable of organization and development.

A careful study of the grey granulation has, however, brought about a change in opinion, and has shown that what was formerly denominated crude tubercle is, in reality, the morbid product at its highest stage, and in its most typical development, and that the cheesy masses are only the result of the degeneration of the grey tubercle. Besides, the study of the forms of degeneration to which different tissues are liable has shown that it is not from tubercle alone that these cheesy masses are derived, but that syphilitic tumours, lymphatic glands, pus, cancer, and sarcomata, may undergo a similar metamorphosis. The conditions necessary to the production of these cheesy masses are that the degeneration should affect elements rich in solids and in saline ingredients, and relatively poor in juices, and that the fluids should be absorbed as the change progresses. There is a close relation between the degeneration in question and the fatty and cretaceous degenerations, fat being developed and gradually absorbed, leaving a substance which has the consistence of mortar, and, finally, by the still further

removal of the fat, a cretaceous mass which may ultimately become very hard.

If, now, we inquire whether there is anything specific in the constitution or composition of the tubercular granules which have been described, the reply must be in the negative. Lebert believed that there were certain solid corpuscles which were pathognomonic of tubercle, but this has been conclusively shown to have been an error on the part of this distinguished observer. It is only by taking into consideration all the circumstances of its origin and progress, its distribution, its seat, its concomitant symptoms, and its termination, that we are enabled to define a certain product as unequivocally tubercular. It is probable, indeed, that there are delicate internal differences, could we ascertain them, which really determine the subsequent course to be taken by the cell, but our means of investigation fall utterly short of their detection. As we shall have occasion to mention presently the structure of tubercle is very closely related to that of some other pathological formations which are grouped together into a series.

When we endeavour to discover, also, to what cause is the morbid impression owing, which is the starting-point of the diseased process, we are met by an insuperable barrier. That there is a definite cause which gives rise to these deformed and aborted cell derivations is pretty certain; its nature altogether eludes our observation. Something like the progressive degeneracy and decay which the Epicureans imagined to be the inevitable portion of the human race seems to have smitten the cells which are affected, and to have imprinted a constantly and rapidly increasing deterioration on every effort of their formative activity:—

> Aetas parentum, pejor avis tulit
> Nos nequiores, mox daturos
> Progeniem vitiosiorem.

We have dwelt on these somewhat speculative points because Virchow's doctrines are accepted implicitly by the writers whose works we are about to notice, and are made the basis of deductions and amplifications, some of which we shall have to discuss.

Of the works mentioned at the beginning of this article the first is by much the most elaborate and important. Dr. Southey's lectures contain an excellent summary of some of the views of Virchow, of whom Dr. Southey is evidently an enthusiastic disciple. Those who wish for a brief and judicious account of the

latest investigations on the structure and the affinities of tubercle will find this work valuable. Those who desire to become more fully acquainted with the doctrines of the great Berlin pathologist will find much fuller and more elaborate details in Virchow's "Cellular Pathology," which has been admirably translated by Dr. Chance, and in the great work on Tumours now in course of publication.

M. Villemin also adopts, unreservedly, the conclusions of Virchow with regard to the textural origin of tubercle. But his work has a much wider scope than the study of the histology of tubercle would involve. Written with great clearness and fulness, and possessing, in a high degree, the admirable method which is so valuable a characteristic of good French works on scientific subjects, M. Villemin's studies form an important contribution to the literature of this much discussed subject.

We have some remarks of considerable interest on the question of the production of pulmonary tubercle. Special embarrassments have been met with in the investigation of this point, owing to the difficulty of ascertaining the existence of the cellular elements necessary for its production. The explanation offered by Schroeder Van der Kolk, and by others, is that tubercle may be developed in the interlobular areolar tissue from the connective-tissue corpuscles, or in the air-cells from the epithelium, which is found on their internal surface, by the usual method of degenerative proliferation. On the other hand anatomists of the highest rank, such as Henle and Luschka, and pathologists of the greatest eminence, deny the existence of epithelium in the air-cells. Villemin, who formerly was of opinion that there was epithelium in the air-cells, has now given up that view, and states that, by some improvements he has introduced in the method of preparing the lung for microscopic examination, he is able to demonstrate not only the absence of epithelium but the presence of bodies having all the characters of cells in the capillary interspaces which are found in the walls of the air-cells. It is from this element that tubercle, in his opinion, is formed. When the proliferation has lasted for some time the partitions which divide the air-cells from each other, are thickened and come to consist of a species of cellular tissue, which gradually encroaches on and diminishes the cavity of the air-cell. A number of enlarged and proliferating cells become detached and fall into the cavity of the air-cell, where, being less provided with nutriment than elsewhere, they undergo various changes which has led to the erroneous belief that they have originated in epithelium.

We have already pointed out the sources whence cheesy substances may be derived, and shown that they may arise from the degeneration of other products besides tubercle; and we have alluded to the fact that masses of this character were long regarded as the typical form of tubercle. By a curious and not unusual change some pathologists have now gone to the opposite extreme, and seem inclined to deny altogether the name of tubercle to this substance, and we find Dr. Southey following Virchow in throwing doubt on whether the masses which are found in the apices of the lungs, and which lead to the formation of vomicæ, are of a tubercular nature at all. He suggests that they may be produced by scrofulous bronchitis or pneumonia, and that their presence at the summit of the lung so long regarded as a strong evidence of their nature, may be merely owing to the fact that from that situation they cannot so easily be dislodged by expiratory efforts as they can be from other parts of the lung.

This opinion appears to us as being at least doubtful. We cannot distinguish by any test, microscopic or other, whether a cheesy mass has taken its origin in a tubercular growth or in an inflammatory product, nor whether it is the result of the degeneration of a mass composed of several different pathological formations. So that it seems impossible, at present, to affirm with any degree of certainty the non-tubercular character of the morbid product in question. For ourselves, we must say, that hitherto we have seen no evidence adduced sufficient to lead us to doubt the correctness of Laennec's doctrine of the invariably tubercular nature of pulmonary consumption.

The relation which exists between scrofula and tubercle has been recently investigated with considerable care, and as this point is one of much interest, we propose to consider it with as much brevity as is possible.

Few questions in pathology have given rise to greater perplexity than the precise signification of scrofula. Frequently understood as commensurate with tubercle, frequently taken in a wider sense as including tubercle and much besides, and exhibiting in its manifestations a similarity to the developments of tubercle so striking as to have given rise to a strong conviction of their being of a kindred, if not identical nature; scrofula has afforded a remarkable example of the employment of a term utterly vague and unsatisfactory as regards any possibility of logical definition, yet possessing a distinct and unquestionable practical value. Investigating the

pathological position and relations of scrofula by the light of the recent advances in our knowledge of morbid processes, it would seem as if our conception of it requires material alteration.

At present pathologists are disposed to regard scrofula and tubercle as altogether distinct from each other. They believe them to differ in seat, in their component elements, and in their mode of arrangement, and they regard the diathesis from which they spring as essentially different. In fine, scrofulous affections have nothing in common with tubercular affections, except that in both the mode of origin is similar, and that, in both, the products of degeneration are identical. This latter character—the power of forming cheesy substance—being, as we have already more than once said, shared by other morbid structures.

An important pathological distinction between scrofula and tubercle consists in this, that the scrofulous glandular enlargement is formed exactly on the pattern of the pre-existing tissue, and is, consequently, a strictly homologous growth, according to the limited signification in which homology is understood by Virchow—namely, an adherence to the type of the part where a pathological new-formation is produced. Tubercle, on the contrary, is uniform wherever found, and, consequently, does not re-produce the type of the part in which it occurs. It is, accordingly, heterologous in the sense in which this term is used by Virchow. It will be seen that no weight is attached to the actual histological structure of a morbid growth in determining its homologous or heterologous character, but that it is assigned to one or other group according to the relation subsisting between it and the part in which it is found.

Scrofula, according to Virchow, manifests itself by hypertrophy or hyperplasia of certain groups of glands. The changes which these undergo being anatomically recognizable, the cellular elements of the glands are increased in number and altered in appearance, and the connective tissue of the glands also undergoes hypertrophic changes which lead to induration of their substance. The glands thus altered are subsequently the subjects of the morbid changes which are familiar to every one. Under the name "lymphatic tumours," he groups together the glandular enlargements observed in Leucemia, or, as it has been named by Bennett, "Leucocythemia;" the enlargements which are found in typhoid fever affecting the lymphatic glands of the mesentery, the solitary glands, and Peyer's patches; syphilitic gland affections, and, omitting several forms, scrofulous glands: these form one division. Another

division of the same class includes tubercle and parresyge. So that the relation to tubercle, possessed by scrofula, is one which is shared by diseases as widely different from each other as syphilis and typhoid fever.

The clinical differences between them are also well marked. The general appearance and habit of body of a scrofulous person is not the same as that of a phthisical subject. Villemin, indeed, is disposed to narrow considerably the field of scrofulous affections, to deny to them any special anatomical characters whatever, and to refer them altogether to an exaggerated excitability of that part of the vegetative system which is composed of lymphatics and connective tissue, leading under slight irritation to prolonged inflammatory disturbances. When growth is most active, and when the body is enlarging, then it is that the manifestations of scrofula are noticed, and they disappear usually after puberty. Tubercle is very frequently found in adult life. Scrofulous affections also are excited by the most varied and ordinary causes, and have consequently nothing in common, in this respect, with tuberculosis, which is the result of a general cause affecting the entire organism.

It follows as a corollary from what has been hitherto stated, that if we accept the fundamental doctrines of cellular pathology, while we must recognize in the phenomena presented to us in the course of tuberculosis, in the simultaneous or successive appearance of tubercles in a number of different organs, the action of a general cause, we must also admit the existence of direct pathological irritation exerted at a number of different points, and giving rise to the granulations which are found on examination. Nor is there anything in this incompatible with the idea of a general cause, that is, of something of a morbific character diffused throughout the system. Special affinities undoubtedly exist between particular substances and particular parts of the organism. Mercury, we are aware, attacks the gums, cantharides the genito-urinary organs, lead the muscles, and we might easily add many more instances of the same kind. It is not that the substances we have named are not diffused throughout the body, but that certain elements are, as far as is known to us, insensible to their action, while certain other parts are injuriously affected.

What is observed with regard to these medicinal substances is also, as Villemin urges, noticed in the case of morbific agents, whose nature is unknown to us, but which we recognize by their

effects. The poison of variola causes inflammation of the epidermis, leading to the formation of pus. The pustules are identical, as far as their contents are concerned, with others which can be produced by artificial irritation. What is specific, is, not the suppuration but the form and evolution of the eruption, and the general symptoms which accompany it. Now, it is similar with regard to tuberculosis, according to Villemin. In this case also we have a virus circulating in the system, and, through a special affinity for particular parts, exhibiting the effects of its presence in different parts of the body. Accordingly, he considers that its pathological affinities are with syphilis or with glanders, and that it really belongs to the class of zymotic diseases. Those familiar with periodical medical literature will remember that a similar statement was made by Dr. William Budd some time ago, and that it attracted a good deal of attention at the period when it was first published by its distinguished author.

One of the most remarkable and interesting chapters of M. Villemin's work is devoted to the pathogenetic conditions of tuberculosis. The author argues, with remarkable ability, in favour of the possibility of the transmission of tubercle by contagion. He believes that there is sufficient evidence of its kinship with zymotic maladies to render this antecedently probable, and he adduces some important considerations bearing on this subject, which we may summarize as follows:—Phthisis is comparatively rare at great altitudes, while, on the other hand, it is very prevalent in low situations. This peculiarity in its topographical distribution has been noted by many observers, and receives a remarkable confirmation from the observations of Dr. Archibald Smith, which were recently published in this journal. Various explanations have been offered to account for the singular immunity possessed by the inhabitants of those elevated regions, such as diminished atmospheric pressure, dryness of air, etc. Villemin regards these as unsatisfactory, and refers to the fact that zymotic diseases generally are very rare at high elevations, as accounting for the circumstance, and as affording a proof of the close relation which exists between tuberculosis and zymotic maladies. Another argument in favour of this analogy is the increased amount of tubercular disease in large centres of population—an increase which is regarded by some observers as being in the direct ratio of the agglomeration of the population. No matter what interpretation we may be inclined to put on it, there can be no doubt that

in rural districts, and in thinly populated places, the frequency of phthisis is less than in cities. According to the returns of the Registrar-General, the inhabitants of towns show a proportion of a fourth more deaths from phthisis for the same number of the population.

But there is a still more remarkable fact, and one on which Villemin lays great stress, namely, that consumption is much more frequent among the inmates of barracks, prisons, and factories than even among ordinary town populations. This, he regards, as only explicable on the zymotic theory of the disease. In his work on practical hygiene, Dr. Parkes has given some important statistical results bearing upon this point. According to the returns, the proportion of deaths from tubercular disease in the army is greatly above that of healthy districts of the country, and the proportion in some arms is absolutely enormous. The tables show, Dr. Parkes observes, "that there must be a large amount of phthisis generated in the army; and in the Foot Guards it would seem to be nearly four times as much as among the civil male population of twenty-five to forty-five years of age."

The Cent Gardes, who may be regarded as the flower of the French army as regards physical development, show a mortality of 9 per 1,000 annually from tubercular disease, while the mortality from the same cause in the City of Paris is only 4·6 per 1,000.

There is some evidence also in favour of the belief that phthisis has only appeared in some countries after they had been visited by Europeans; a fact which, if established, would give support to the contagious character of the disorder. With regard to North America, New Zealand, and other countries, we have the testimony of various travellers that the disease was unknown before the advent of European immigrants. Of course evidence of this kind is not altogether reliable, and the facts, even if admitted, are susceptible of a different explanation, namely, that the habits of the aborigines had been deteriorated by the contact of the new settlers; but so far as they go they rather tell in favour of the transmissibility of the disease. Again, the strong popular conviction of the contagious character of phthisis is not to be overlooked. In the south of Europe the bed-clothes of a patient who has died of consumption are invariably burned, and phthisical persons are shunned as dangerous to the health of those who hold communication with them. In this country there is a deeply-rooted belief among the people, that persons brought into intimate relations with

consumptive sufferers, occupying the same bed for instance, as in the case of husband and wife, are liable to contract the malady; and the numerous instances in which the wives of phthisical persons become themselves phthisical lend some colour to the belief. Some of the most eminent members of the medical profession have held similar opinions. The following remarks, made by Andral in his notes to Laennec's treatise on auscultation, are marked by the admirable sense and by the soundness of judgment which characterize the writings of that eminent pathologist, and really represent all that can be as yet said with any certainty on the subject :—

"The fear of the contagion of phthisis pulmonalis, was, during the preceding century, carried very far indeed. Morgagni himself acknowledged that he ventured to make but very few *post mortem* examinations of the bodies of phthisical patients, for fear of taking the disease. He retained this prejudice during his entire life; as we read in one of his letters the following phrase: *phthisicorum cadavera fugi adolescens, fugi etiam senex.*

"No doubt the facility of the contagion of phthisis pulmonalis has been very much exaggerated. Still is it wise to deny it absolutely and in all cases? Who could venture to affirm, that a disease which can never be considered as purely local, and which, according as it advances, presents, as it were, an infection of the entire system, is not susceptible of being transmitted in cases where very close and continual contact (as lying in the same bed) exposes a healthy individual to absorb the miasms driven off both from the pulmonary mucous membrane and the skin of a phthisical patient? I certainly have been more than once struck at seeing women begin to present the first symptoms of pulmonary consumption a short time after their husbands had died of this disease. At all events, the facts ascertained on the subject of the contagion of phthisis are of sufficient importance to induce those who are in constant attendance on phthisical patients to take all possible precaution, more especially during the advanced stage of their disease."

Villemin refers to the following curious statement made by Laennec himself, which we have deemed of sufficient interest to reproduce here :—

"Can direct inoculation produce the development, at least the local development, of tuberculous matter? I have but a single fact on this head, and, although a single fact proves little, I think it ought to be stated here. About twenty years ago, whilst examining some vertebræ in which tubercles were developed, I slightly grazed the index finger of my left hand with the saw, but paid no attention to it. On the next

day a little redness appeared on it, and there was formed by degrees, almost without pain, a small roundish tumour, which at the end of a week had reached the size of a large cherry-stone, and seemed situated in the substance of the skin. At this period the epidermis cracked over the tumour just at the spot where the saw had passed, and exposed to view a small yellow body, firm, and precisely resembling a crude yellow tubercle. I cauterised it with deliquescent hydro-chlorate of antimony (*butter of antimony*), which gave me scarcely any pain, and when after a few minutes the salt had penetrated the whole of the tumour, a slight pressure removed it in an entire state. The action of the caustic had softened it so far as to render it exactly like a softened tubercle of friable consistence. The place which it had occupied formed a species of small cyst, the walls of which were of a pearl-grey colour inclining to a semi-transparency, and without any redness. I again cauterized them; a cicatrix was quickly formed, and I have never since felt any inconvenience from this accident."

The treatise on auscultation appeared in 1819. In 1822 Laennec was obliged to give up practice owing to phthisis, from which he died in 1826. The coincidence is sufficiently curious, and the local effects, produced at the seat of injury, closely resemble, as will be seen hereafter, the phenomena observed in animals at the points where inoculation of tubercular matter has been practised.

It is evident that the possibility of the spread of tubercle by contagion is in direct antagonism to the generally-received opinion with regard to its hereditary transmission. If phthisis be in any considerable proportion of cases derived from parents, it would be, *a priori*, highly improbable that it should be of zymotic origin. Zymotic diseases do not remain dormant in the system for many years to break out at the end of a long period of repose. Syphilis, it is true, is transmissible to offspring, and has periods of latency during which active symptoms are absent; but even during these periods the evidences of the constitutional diathesis are distinct and unequivocal. On the other hand, phthisis manifests itself often in persons who have reached the age of twenty or thirty years with all the external characters of vigorous health.

But the evidence in favour of the wide-spread belief in the hereditary character of phthisis is by no means altogether satisfactory. Dr. Walshe, who has devoted a great deal of attention to this subject, analysed the family history of 446 hospital patients, and arrived at the conclusion "that phthisis in the adult hospital population of this country is, to a slight amount only, a disease

demonstrably derived from parents." On this question Villemin observes that the enormous mortality from tubercular diseases amounts to an aggregate so great as to render it a matter of probability that the great majority of families will have in some way become connected with it. In France, with a population of less than 40 millions, 160,000 die annually from tubercular diseases. Accordingly, about 5 millions of people have fallen victims to these maladies during the lifetime of a man of thirty years of age. In this immense number, equalling one-eighth of the population actually living, it is not to be wondered at that there should be representatives of a vast number of families, and that in tracing the genealogy of a phthisical individual, alliances can be found with some of those who have constituted this formidable total. Very much the same may be said of the family history of non-phthisical persons; in fact, as has been observed by Walshe, if we take any class of individuals in hospitals, whether phthisical or not, it will be found that a considerable proportion of the generation from which they sprang was tubercular. Undoubtedly an aptitude, or proclivity, to particular diseases is inherited; but it seems at least doubtful whether we can go further than this with regard to phthisis.

It will be at once evident that a point of cardinal importance for determining the pathological position of tuberculosis is whether or not it is capable of being propagated by inoculation. If this be determined in the affirmative, it goes a great way to establish its analogy with syphilis and other kindred diseases, and furnishes a powerful argument in favour of its zymotic nature. This, which is the experimental aspect of the question, has been examined with great industry and ability by Villemin, and it is by his observations on this point that his name has become known in this country. In France he had, already, acquired considerable reputation as an investigator. The operative procedure employed by him consisted in making a subcutaneous incision with a narrow-bladed bistoury, and introducing into the little wound a small portion of tubercle. At first he always used portions of both grey and yellow tubercle, but subsequently he employed the yellow alone, having found that it produced the effects with most certainty.

When tubercle is inoculated in this manner no local phenomena are observed for two or three days ; at the expiration of that time a little redness, with some heat and swelling, are observable, which disappear in three or four days more. Then a slight nodosity can be recognized situated beneath the skin, and movable with it,

giving to the touch a sensation closely resembling an indurated chancre of the prepuce. After a variable period an opening is formed, through which a cheesy matter escapes. This opening sometimes closes, but at the end of some time it again opens. The nodosity, which sometimes, especially in inoculations from rabbit to rabbit, attains the size of a small nut, exhibits on section the characters of a subcutaneous tubercle, and a number of small miliary granulations are found around the principal mass. The lymphatic glands, which are in connexion with the points of inoculation, invariably become enlarged, and contain granulations, sometimes, even, become altogether changed into cheesy masses. The lymphatic vessels leading from the place of inoculation frequently become converted into solid cords, and their walls are found to be infiltrated with tubercles. The lungs and other viscera also, as the kidneys, spleen, &c., are found to contain tubercle. Besides these experiments with tubercle itself, Villemin employed, for inoculation, the sputa, and even the blood of phthisical patients, and found that by these substances tubercle could be produced. He also inoculated with portions of the little tubercular masses, which, as has been described, are formed at the situation where the inoculation is practised, and found that tubercle could be produced by this method also.

On the other hand, inoculation practised with pus, cancerous matter, and other morbid products, has, in Villemin's hands, been productive of only negative results; in no instance has tubercle been produced.

Tubercle from the human subject has been inoculated by Villemin on rabbits, guinea-pigs, dogs, cats, sheep, and birds. He has also inoculated the rabbit from the cow, and rabbit from rabbit. He has found that certain species are remarkably susceptible of tubercular disease, and that certain species are, on the other hand, refractory to it; another proof, in his opinion, of the analogy between tuberculosis and specific diseases, which latter are restricted usually, perhaps universally, to a limited number of animal species. The rabbit and guinea-pig exhibit considerable proclivity towards tubercular development. The sheep and goat seem refractory to the virus.

With regard to the period of incubation of tuberculosis, Villemin regards it as being from 10 to 20 days, reckoning by the time which elapses from the inoculation until the appearance of tubercle in the lungs or other viscera. In the kidneys, or spleen, evidences of tubercle are generally found before the twenty-eighth day.

These results, which we have thus rapidly sketched, and for a full account of which we refer the reader to Villemin's work, from which we have drawn our account of them, naturally excited great attention. Nothing could be more completely at variance with the accepted pathological doctrines regarding tubercle. The non-contagious character of phthisis was regarded as an axiom; and in systematic works on medicine the question was passed over as one which did not require or admit discussion at all. Here, however, was a series of propositions, based on direct experiment, which seemed to strike at the root of our established convictions. A number of pathologists in France, in Germany, and in England, at once set about the investigation of these startling statements.

Herard and Cornil, Lebert, and Mr. Simon, arrived at results confirmatory of the direct experiments of Villemin. Dr. Marcet, who employed guinea-pigs in his experiments, suggested, in a communication to the Medico-Chirurgical Society, that the inoculation of animals might even be employed as a means of establishing the real nature and prognosis of a doubtful disease. He stated, as the result of a considerable number of observations made with much care, that the sputa of phthisical patients are capable of leading to the formation of tubercles in some animals when introduced into them by inoculation; and that if the inoculation of two or more guinea-pigs with the expectoration of a person believed to be in advanced phthisis be not followed by the development of tubercle in the animals within fifty days, we may conclude that the softening of the tubercles in the patient is, for the present, arrested, and that, consequently, his condition is relatively favourable.

The progress of experiment, however, soon began to throw some additional light on the subject of the formation of tubercle. Lebert, Dr. Sanderson, and, more recently, Dr. Wilson Fox, have shown that tubercle, or a morbid product undistinguishable from it, may be developed in animals as the result of the inoculation of various substances, or even as the result of irritation without inoculation at all. Dr. Sanderson found that the insertion of a seton under the skin of guinea-pigs is followed by the development of morbid changes of the same nature as those produced by the inoculation of tubercle, and these observations have additional weight as they were carried on in co-operation with Mr. Simon. Lebert states that he has produced tubercle by introducing mercury and charcoal into the circulation as emboli.

Dr. Wilson Fox has found that tubercle may be developed in

guinea-pigs after inoculation with vaccine lymph, and with putrid muscle, and after the insertion of a piece of cotton thread under the skin. He has found, however, that the effect in question can be more certainly produced by the inoculation of tubercle than by that of any other substance.

The result of these experiments would undoubtedly seem to overthrow Villemin's statement with regard to tubercle being only producible by the tubercular virus, but to leave untouched his statement as to its capability of being produced by tubercle. As observations multiply we shall, no doubt, gain much additional insight into these important questions. What tends in no small degree to embarrass the subject is the impossibility, with our present knowledge, of determining the tubercular character of a particular morbid product on merely histological grounds, so that we find pathologists frequently at issue on points of this kind.

If we admit, as the concurrent testimony of numerous observers indicates, that a substance which resembles tubercle so closely as to be undistinguishable from it, and which is in all probability identical with it, can be produced in the organs of several of the lower animals as a result of inoculation, we have still to seek for the interpretation of the fact. Villemin looks upon it as a proof of the virulent and specific nature of tuberculosis. Lebert, on the other hand, regards the pathological changes which are found as being in no way specific, but as entering into the general category of inflammatory processes. Again, some experiments of Goujon and Carbadé, who found that inoculations of pancreatic juice and of pigment cells from the choroid were followed by multiplication of the elements so introduced, suggest the possibility of an explanation founded on the analogy of what takes place in animal grafting—namely, that the cells which are introduced into the organism by the inoculation grow and reproduce themselves simply according to the conditions of nutrition in which they find themselves, and altogether independently of anything of the nature of infection or contamination of the system. Dr. Wilson Fox is disposed to regard the introduction into the economy of substances of a septic nature as the necessary element for the artificial production of tubercle. He looks upon the inoculation of tubercle as being only effective through that substance possessing a septic character, and not through any specific property inherent in it. He explains the effect of the seton by its setting up inflammatory action, the products of which when absorbed exercise a septic influence. Other

explanations of a more or less ingenious character have been put forward, but it cannot be said that any thoroughly satisfactory elucidation has, as yet, been arrived at.

It may fairly be asked what practical results are likely to follow from observations such as those with which we have been engaged. That Dr. Marcet's suggestions are, at least, premature, may, we think, be fairly assumed. Nor, indeed, would they possess much practical value even if their accuracy were established. Experiments of the kind which he has proposed are always difficult, liable to error, and not likely to be generally adopted by those who are engaged in the toil of actual practice. But there is some ground for hoping that from wider and clearer views of tuberculosis some important practical results may follow. Villemin, with an enthusiasm which is almost contagious, sees, in his discovery, the germ of great future benefit to humanity. He thinks that some prophylactic may be found which will procure for our race an immunity against this terrible scourge, such as the immortal discovery of Jenner has conferred upon us with regard to small-pox.

Without sharing in these sanguine expectations, we cannot but hail every advance in our knowledge of the pathology of tuberculosis as a step in the direction of the discovery of a rational and useful therapeutical management of the disease. And if its contagious character should come to be established, and the present writer regards the evidence in favour of this as very strong indeed, it will lead to great and obvious changes in our management of phthisical patients, and to the adoption of precautions which, under this supposition, would be of immense utility, and which are now generally disregarded. The field of observation is as yet only entered upon, and it will unquestionably yield a rich harvest to those who cultivate it.

On Diseases of the Chest: being Contributions to their Clinical History, Pathology, and Treatment. By A. T. H. WATERS, M.D. London: John Churchill and Sons, New Burlington-street. 1868.

DR. WATERS, to whose essay on the anatomy of the human lung the Fothergillian gold medal was awarded some years ago by the Medical Society of London, and who is favourably known to the profession by his contributions to thoracic pathology, has, in this

volume, collected together a number of papers, contributed by him to different periodicals, on some of the more important diseases of the chest. He has also reprinted a treatise on emphysema, which he had published some years ago. There are besides a number of essays in the volume which we have not before seen, and which we presume have not been previously published.

The pulmonary affections which are discussed, and which occupy the first part of the volume, are pneumonia and emphysema, which are treated at considerable length, phthisis, asphyxia, pleurisy, œdema of the lungs, and there are some remarks on pulmonary apoplexy, gangrene, and fetid expectoration.

In the second part we find chapters on the sounds of the heart, on pericarditis, fatty disease of the heart, chronic valvular disease, sudden death in relation to heart disease, thoracic aneurism, and on the use of alcoholic stimulants.

The contents of the volume are, as will be seen from this summary, of a varied and interesting character, and the subjects are treated in a thoughtful and suggestive manner.

It is to be regretted that the author, or, perhaps, we should say the publisher, has, we are sure, inadvertently, chosen a title which may possibly mislead the public as to the contents of the volume. A work on "*Diseases of the Chest*" is generally understood to be a systematic account of all the more important affections of that portion of the body. A student, attracted by the well-deserved reputation of Dr. Waters, might purchase this book with the belief that he could employ it as a text-book, in the same manner as the well-known treatises of Stokes, Walshe, or Fuller; and might fairly complain that the designation of the work had encouraged him in his incorrect estimate of its character and extent. It would be desirable that this source of error should be obviated by some addition to the title which would make it more clearly express the nature of the work, and the exact range of the subjects which are treated of in it.

The first chapter is devoted to a summary of the minute anatomy of the lung; on some points connected with which the author entertains opinions at variance with those generally adopted. His views, which deserve careful consideration, are detailed more fully in the work on the anatomy of the lung, to which we have already referred.

The subject of *pneumonia* is treated at length; the observations on this disease occupying eighty pages of the volume. Pure

pneumonia, according to the author, is essentially an inflammation of the walls of the air-sacs. The term "air-sacs" is used throughout the volume to signify the cavities "which constitute the ultimate expansions of the air tubes." Their walls consist of yellow elastic tissue, and of a basement membrane inclosing the pulmonary plexus, and they constitute the true parenchyma of the lung—the interstitial tissue, which some pathologists have regarded as being the seat of the inflammation, having no real existence in the lung, with the exception of a small quantity which invests the various tubes and vessels, and surrounds the different lobules. This is the opinion originally, we believe, expressed by the late Dr. Addison, and that which, undoubtedly, represents the true view of the disease. The vessels which are involved in the inflammation, and which furnish the inflammatory products which are poured out during its progress, are the ramifications of the pulmonary artery, constituting the pulmonary plexus. The capillaries derived from the bronchial arteries do not share in the inflammation at all, unless bronchitis be present in addition to pneumonia. In support of this view of the pathology of the disease the author adduces certain anatomical considerations as to the mode in which the lungs receive their vascular supply. It is from the pulmonary plexus that the parenchyma of the lung derives its nutrition, so that the pulmonary artery not only subserves the important function of carrying the blood to the lung, to be there subjected to the action of the atmosphere, but also supplies the materials necessary to the maintenance of the integrity of its tissue, and is, in fact, the only vessel from which branches proceed to the air-cells at all.

This conception of pneumonia possesses, in the author's opinion, the advantage of greatly simplifying our notions with regard to the disease, as it localizes it in the pulmonary plexus, and as it accounts at once for the rapid and extensive consolidation which frequently occurs by indicating a source from which abundant materials may readily be derived. It also explains why pneumonia is so often accompanied by great febrile disturbance, inasmuch as it may be regarded as a blood disease. It fails, however, we think, to explain some of the difficultieswhich beset this interesting question. The remarkable difference which exists between bronchitis and pneumonia—a difference which extends to the progress and symptoms of the two affections in as marked a manner as to the anatomical changes found in the lungs on *post mortem* examination—cannot be accounted for merely by the fact that a different set of vessels

is concerned in the inflammatory process which is the essential element in both affections. Besides, as has been well pointed out by Henle, in the recently published volume of his great work on anatomy, such a sharp division between the distribution of the bronchial and pulmonary vessels, as this view involves, is in reality impossible; not only is the bronchial membrane directly continuous with the air-cells, a fact which necessarily involves some amount of anastomosis between their capillaries; but it is stated that the pulmonary artery supplies branches which are distributed to the mucous membrane of some of the bronchial tubes themselves. Yet we do not find that the tubes to which these branches are distributed become filled with exudation. In fact we must look deeper than mere differences in vascular supply for the solution of this important pathological problem. It has been suggested by Villemin, in a paper published in the *Archives Générales de Médecine* for 1866, that the nuclear or cellular bodies which are found in abundance in the interspaces of the capillary plexus of the air cells, may furnish the element necessary for the interpretation of the morbid process in question. The existence of these bodies has now been verified by numerous microscopists of eminence, and the recognition of their presence supplies the cellular element indispensable, according to the current pathological doctrines, for the formation of the morbid proliferations which ultimately fill up the air cells.

Dr. Waters has been able to detect in two cases of pneumonia a modification of the respiratory sounds before crepitus became developed. In both cases the inflammation arose in lungs which were previously unaffected by disease, and in both a loud harsh respiratory murmur became audible, which was, on the following day, replaced by distinct crepitus. These observations possess some value with reference to the stages of the disease.

It had been taught by Dr. Stokes, that prior to the stage of engorgement there was a stage of pneumonia characterized by dryness and injection of the pulmonary membrane, and capable of being discovered by auscultation. This opinion has been generally regarded by subsequent writers on the chest, as theoretically correct, but as being of little practical value. Dr. Waters's cases furnish additional evidence of the clinical importance of the recognition of this stage, and deserve to be carefully studied. The mode of production of the normal respiratory murmur, and of this modification of it, is thus explained:—

"The air-sacs consist of somewhat elongated cavities, which communicate with a bronchial ramification by a circular opening, which is usually smaller than the cavity to which it leads, and has sometimes the appearance of a circular hole in a diaphragm, or as if it had been punched out of a membrane which had closed the entrance to the sac.

"This arrangement is best seen in the lungs of children and of adults. In old age it has frequently disappeared, more or less. It may be often well seen in a piece of lung, the blood-vessels of which have been injected with coloured size, and which, after being dried, has been subsequently soaked in spirit. By careful dissection under a microscope, the membrane, guarding the mouth of the sac, and narrowing the entrance to the cavity, is easily demonstrated. The membrane forms a part of the aerating walls of the air-sac, and has branches of the pulmonary artery ramifying in it.

"It is obvious that a condition of this kind must have an influence on the passage of the air into the air-sac; that, to a certain extent, it must produce an impediment to the current of air, and thus give rise to a sound.

"As the air is moved along the bronchial tubes it meets with no obstruction to its passage; but at the commencement of the air-sacs an opening exists which is smaller than the cavities between which it is placed. As the air-sacs expand with each inspiration, air must pass through the constricted opening. I believe that, in the passage of the air through this opening, the main element of the respiratory murmur consists."

The author believes that the harsh puerile respiration of incipient pneumonia,

"which is merely an exaggeration of the healthy sound, is the result of the dry and swollen condition of the pulmonary membrane; that this gives rise to a constriction of the mouths of the air-sacs, and approximates therefore, to the condition which they present in childhood, when a loud respiratory murmur is heard."

The treatment of pneumonia is fully discussed. The author, we think wisely, does not confine himself to any routine plan of dealing with the disease. The tendency of his treatment is rather towards the stimulating and supporting plan, although he occasionally employs remedies of the antiphlogistic class.

Antimony he sometimes prescribes, but usually only in small doses. In cases where the pulse is weak and rapid, or where there is a deficiency of constitutional power, he does not give it at all. Alcohol has been given in a large proportion of his cases, apparently

with decided advantage. When the pulse is quick and feeble, without sharpness, when there is much debility, or when delirium is present, stimulants are indicated. Calomel and opium he considers as unnecessary in the treatment of the disease, but opium alone relieves pain, allays the cough, and procures sleep. The pain in the side which physicians usually regard as a symptom to be met by local depletion may generally be relieved by a dose of opium.

Ipecacuanha is of value as an expectorant and diaphoretic, but is to be discontinued when it produces nausea.

Carbonate of ammonia and chloric ether, usually prescribed together, by Dr. Waters, are regarded as valuable from their stimulant effects.

"With regard to the administration of salines, such as citrate of potash and acetate of ammonia, I do not, as a rule, prescribe them either in this, or in any other inflammatory affection. I think it doubtful whether the routine practice of constantly administering these substances in inflammations is a desirable one. There can, however, be no doubt that they are sometimes agreeable to the patient, and afford relief to the distressing thirst which is occasionally present. Further, by supplying water and certain constituents to the blood, they may promote the action of the skin, as well as of other excreting organs, and thus have a curative effect. At the same time, I would remark, in referring to the action of the skin, that it by no means follows that the existence of the hot, burning, dry skin, so frequently met with in pneumonia, necessarily indicates the use of salines, or of antimony, or of any other of the so-called diaphoretic medicines. This condition is sometimes rapidly relieved by the sole administration of some form of alcohol; and, in fact, wine or brandy will occasionally be found the best diaphoretic we can use."

Blisters are important agents in treating the disease after consolidation has taken place. They cause contraction of the capillaries by a reflex action of the vaso-motor nerves, and assist in promoting absorption of the exudation.

Much weight is justly attached to the judicious administration of nourishment.

"For the most part, in the early stages, the quantity of food given may be safely left to the desire of the patient. As the case progresses and the appetite begins to improve, the diet should be more liberal; and you will find that, as soon as convalescence is established, solid food will be borne. In such cases as require a very early and free administration of alcobol, nutrients should be given liberally from the first. Beef-tea and

milk are usually well borne; and if the former be properly made, a good deal of nourishment may be introdnced into the system by means of it."

An abstract is given of the principal facts with regard to forty-four cases of pneumonia treated by the author, in the Liverpool Northern Hospital. Of these cases, all, with a single exception, terminated favourably, a result which certainly affords strong evidence in favour of the judicious character of the treatment employed.

Of *emphysema* we have a very elaborate account. Pulmonary vesicular emphysema he divides into three forms: lobar, lobular, and partial lobular. Of these, the first is by far the most important and formidable affection. It usually involves both lungs, and the lower as well as the upper lobes. It also generally takes its origin from constitutional causes, without antecedent cough or irritation. The other and more partial forms are not only more limited in extent, but also very frequently arise from mechanical causes.

As to the nature of the constitutional affection which gives rise to lobar emphysema, the author considers that it is impossible at present to pronounce. Degenerative changes may exist in the lung tissue, but these are not, as supposed by Rainey and Dr. C. J. B. Williams, of a fatty character, nor are they fibrous, as advocated by Sir William Jenner:—

"Notwithstanding, however, that my investigations do not enable me to say what is the exact nature of the degeneration which leads to the production of emphysema, nor yet, whether it commences as an affection of the capillary blood-vessels, or of the elastic fibres and basement membrane, I do not entertain the slightest doubt that *the disease in its severer forms is of a constitutional nature; that one of its most important features, and perhaps the primary step in it, is a mal-nutrition of the pulmonary tissue, causing its degeneration, and giving rise to all the structural changes which I have previously described.* That fatty deposit occasionally exists, I have already stated; but the question arises whether this is a primary cause of the anatomical changes which take place, or whether it may not be the result of the imperfect nutrition which necessarily ensues in the progress of the disease.

"The view which I have taken, of the constitutional nature of emphysema, receives support from the facts which have been brought forward with reference to its hereditary character. On this point I quote the observations of Jackson, which furnish us with very important results. He found that, of twenty-eight persons suffering from emphysema of the

lungs, eighteen were born of parents (father or mother) affected with the same disease, several of whom had died of it. In some instances the brothers and sisters of these persons were also emphysematous. On the other hand, of fifty persons not affected with emphysema of the lungs, three only were born of emphysematous parents.

"Facts of this kind tend to throw great doubt on the opinion that emphysema is solely produced by mechanical dilatation of the healthy air-sacs, and to favour the view that it has some deep-seated pathological cause in connexion with the lung tissue."

Regarding the causation of the partial forms of emphysema, Dr. Waters rejects the theory of Gairdner as to effect of collapse of a portion of the lung on the production of over-distention of the remaining uncollapsed portion, and regards with favour the expiratory view, so forcibly advocated by Jenner, which refers the origin of emphysema to unequal compression of different portions of the lung during violent expiratory efforts, as in coughing.

In the second part, a chapter is devoted to the sounds of the heart. The theory of Rouanet and Billing, with regard to the production of the first sound by the closure and tension of the auriculo-ventricular valves, is advocated by the author, who assisted Dr. Halford in his well-known experiments on this subject. Halford's experiment on the effect produced by the stoppage of the supply of blood to the heart, from the systemic and pulmonary veins, in causing a complete cessation of both sounds, which were again heard when the blood was again allowed to flow into its cavities, is regarded by the author, who has often witnessed it, as decisive on this point.

In the treatment of pericarditis, Dr. Waters is a decided non-mercurialist. The only fatal case of acute pericarditis, uncomplicated with Bright's disease, which has occurred in his hospital practice, during a period of eight years, was one in which, contrary to his usual practice, he had given mercury to salivation. Although this drug is now abandoned in the treatment of this disease, as well as of so many others, in which it was formerly considered indispensable by many of the ablest practical physicians of the day, yet we do not think that the grounds on which Dr. Waters excludes it are likely to meet with general approval.

He believes that mercury, by its tendency to diminish the plasticity of the blood, favours liquid effusion; and, as the best result which can reasonably be expected in pericarditis is adhesion, that this tendency must be directly injurious. While

not disposed to differ with the author's low estimate of the antiphlogistic powers of mercury, we think that all practical experience shows that it possesses very considerable efficacy in the removal of liquid effusion.

There is an excellent chapter on valvular disease of the heart, containing some valuable practical remarks on the prognosis to be made in these affections, as well as on the diagnosis of cardiac murmurs. On one point we are compelled to differ from the author. He states that a mitral systolic murmur is sometimes produced without regurgitation through the valve, "simply in consequence of a thickening of, or a deposit upon, the valve, which giving rise to unequal vibrations, causes a murmur." This opinion he seems to have formed in consequence of having observed cases in which persistent mitral murmurs had existed without any evidence of secondary disturbances of the circulation, either in the lungs or elsewhere.

With our knowledge of how slight an amount of valvular incompetence may cause a murmur, we cannot regard this as a sufficient reason for denying the existence of regurgitation in these cases. Besides, too, it is simply inexplicable how a sound of the character of a murmur could be produced in the manner suggested by the author. Thickenings, both of the mitral and of the aortic valves are very common; in fact, in *post mortem* examinations it is the exception to find these valves in a perfectly healthy condition; and yet a diastolic murmur at the aortic orifice from mere thickening of the semi-lunar valves without regurgitation is absolutely unknown. An inequality in vibration may modify the character of a sound, but that it could generate a bellows murmur is, we think, contrary both to clinical experience and to acoustic principles. Todd was of opinion that a mitral murmur might be developed without regurgitation, but his notion of its production was that it took place when the ventricular aspect of the valve was roughened by deposit, and that it was caused by the passage of the blood over the inequalities thus formed. This view, however, has not been adopted for obvious reasons; indeed, no opinion is more universally entertained among writers on cardiac disease, than that a mitral murmur always signifies regurgitation.

On the subject of mitral diastolic or pre-systolic murmur, the author agrees with the majority of observers as to the infrequency of this sound. In cases of mitral obstruction, he states that murmur is far more frequently absent than present, and he has

observed that it may be absent on one day and present on the next, and *vice versa*, its presence or absence possibly depending on the condition of the auricle as regards its vigour of contraction.

A question of much interest is dealt with in the succeeding chapter, namely, that of *sudden death in heart disease.* The form of cardiac affection most liable to terminate in sudden death, is held to be fatty degeneration. Of valvular diseases, in the experience of the author, about equal numbers of cases of mitral and of aortic disease have terminated suddenly; but he is inclined, on theoretical grounds, to regard mitral disease as that most likely to lead to a suddenly fatal termination. Valvular disease, in his opinion, rarely produces sudden death, unless there is also some weakening or degeneration of the muscular fibre.

Some very interesting cases of aneurism are recorded; in one, the mode of treatment by absolute rest advocated by Mr. Tufnell, of this city, was tried with some advantage. The patient was confined to bed and kept in the horizontal posture for eleven weeks. His diet was restricted to seven ounces of bread, three ounces of meat, and eight ounces of fluid per diem. He was allowed a little ice and one pipe daily. The effect of this treatment was to diminish the size and prominence of the tumour, and apparently to cause a deposit of fibrin in the sac. This was the more remarkable as other means such as ice to the tumour, acetate of lead, &c., had been employed without any good result. The deposit of fibrin, however, occurred only in the anterior part of the sac; the patient returned to his employment, that of a ship watcher, and at the end of seven months after leaving the hospital, died suddenly from rupture of the posterior wall of the aneurism.

The following opinions with regard to the value of alcohol in disease, which are found in the concluding chapter of the book, possess some novelty. After observing on the effects of alcoholic stimulants on the circulating system, as evidenced by increased power of the heart, and diminished frequency of pulse, the author proceeds:—

"But the effects which alcohol produces on the circulation cannot be accounted for, I think, simply on the ground that it acts as a stimulant and tonic to the heart. It has been proved by some physiologists, that the introduction of certain substances into the blood has a tendency to increase the rapidity of the circulation, whilst the introduction of others has a directly opposite effect. Amongst the latter is alcohol; and, according to the observations that have been made, when this substance is

injected into the vessels of a living animal, there is a retardation of the circulating current, apparently from some physical influence which the alcohol produces, either on the blood itself, or on the coats of the vessels, or on both. And I would here remark, that when alcohol is taken into the stomach, although we have evidence of increased action of the heart, this by no means proves that the blood is circulating more rapidly through the capillaries of the body. The very symptoms, indeed, which follow the administration of a small dose of alcohol—namely, a sensation of fulness and heat of skin—and the congestion which ensues when the dose is increased, tend to prove that there is some impediment to the peripheral circulation. Such a state of capillaries must, necessarily, give rise to an increased tension of the arterial system, and a fulness of the pulse; especially when taken in connexion with the effects produced on the heart itself by the action of alcohol.

"It appears to me, that a knowledge of this local action of alcohol on the capillaries, serves to explain, in some measure, the effects which we witness, in certain cases of disease, from its administration."

We may observe, as an instance, if such were necessary, of the danger of theorizing on subjects connected with practical medicine, that it is on precisely contrary grounds to these, that alcohol is recommended in some forms of disease by many of the ablest practical physicians. For example, in typhus, when the maculæ are dark, it is administered with the object of quickening the capillary circulation, and removing the peripheral congestion, objects which its use in many cases undoubtedly attains. We believe that for the present we must be content with the beneficial effects which alcohol so frequently produces without endeavouring to explain what the state of our knowledge does not enable us to, as yet, thoroughly comprehend.

We have by no means exhausted the points of interest in the work, but we have done enough, we hope, to indicate the interesting and important character of its contents, and the ability with which Dr. Waters deals with his subjects. We have only to add that the views of the author on the anatomy of the lung, and on emphysema, are illustrated by nine plates, based on original drawings.

Thesaurus Craniorum. Catalogue of the Skulls of the Various Races of Man in the Collection of JOSEPH BARNARD DAVIS, M.D., F.S.A., &c. London: printed for the Subscribers. 1867.

A MARKED feature in anatomical science, at the present time, is the attention paid to the human skull and its principal varieties,

and the degree of accuracy with which both the individual race characters, and deformities of the cranium are distinguished, the one from the other. The stimulus given to craniology by the researches of Gall and Spurzheim, however erroneous their doctrine may be in detail, has produced its abundant fruit in directing attention to modifications of form and of measurement, which otherwise might have passed unnoticed. The work under notice at present is among the most recent of the contributions to craniological literature, and, coming as it does from the pen of one of the joint authors of *Crania Britannica*, it well deserves a careful study; and, when taken in connexion with the works of Morton and Meigs, of Owen, Huxley, Van der Hœven, and Von Baer, it affords abundant material for the study of craniology. To the ethnologist such a work properly, executed, is a mine of immense value; while to the anatomist it affords a mode of determining the degree of frequency of cranial deformities and of osseous abnormalties; and to the zoologist a catalogue like the present affords the most important evidence on a vexed question, the unity or plurality of race in the human family. Very wisely, Dr. Davis has, in general, avoided any thing but a detail of facts; and he has selected these facts, for the most part, judiciously and well, and this constitutes the great value of the book. The arrangement is geographical, and a very fair representation of the crania of the principal races of the world will be found in the catalogue. The style of the book can be illustrated in the best manner by an example; we will take an instance from p. 128:—

"1.—943. Armenian fem. of considerable age. Calv. D. C.

"A, 67; B, 19·3; C, 14; *a*, 4·6, *b*, 4·7, *c*, 4·7; D, 14·2; E, 6·9; F, 5·1*t*; *a*, 4·2, *b*, 4·8, *c*, 3·9; G, 5·3; *a*, 4·5, *b*, 4·5, *c*, 4; I, 4·8; J, 73; K, 76.

"A long, narrow, regular calvarium of a woman.

"This skull exhibits the *condylus tertius* of J. F. Meckel in the form of a low tubercle in the middle of the anterior edge of the occipital foramen, which has an articular surface for the processus dentatus of the second vertebra."

The very comprehensive series of measurements (which are A, internal capacity; B, circumference; C, fronto-occipital arch, divided into *a*, frontal part; *b*, parietal; *c*, occipital; D, intermastoid arch; E, longitudinal diameter; F, transverse diameter, which may be *t*, temporal, *f*, frontal, or *p*, parietal; *a*, frontal breadth; *b*, parietal breadth; *c*, occipital breadth; G, height, which may be *a*, frontal,

b, parietal, and *c*, occipital; H, length of face; I, breadth of face; J, cephalic index; K, proportion of height to length, the latter taken as 1·00,) show the immense labour which the book entailed; and, whatever faults it may have, every one must agree to regard it as a monument of untiring industry and care.

The anatomical notes given in this volume are of great interest; for example, we learn that in this collection the proportional frequency of occurrence of an open frontal suture is once in twenty-nine instances, a proportion smaller than one would, at first sight, expect; for out of twenty-five skulls, taken at random, in the College of Surgeons' Museum, Dublin, this suture is present in six; possibly, indeed, its existence may not be recorded, in all the skulls of Dr. Davis's collection in which it may exist, or it may be a character commoner in British skulls than in those of aboriginal races, although the catalogue does not favour this idea. Again, we learn that the spheno-parietal suture is absent either on one or both sides in the proportion of one in fifty-eight instances; so that this character, so often remarked as pithecoid, really does occur with a comparative degree of frequency in human skulls. Again, we cannot but be struck with the variety of capacity in the series. "This (measurement) is determined by filling the calvarium with dry and clean Calais sand, the specific gravity of which is 1·425, and then weighing the sand." In one skull, 1045, p. 59, the capacity is given as 56 ounces; in another, 59; in another, 92; in another, 90; in another, 102. In an appendix, on the capacity of skulls, we learn the following singular facts that of the skulls of European races, the Germans, Russians, and Finns, are the largest, and are followed in regular order by the Welsh, Turks, Italians, Swedes, Scotch, Irish, English, whose heads are a little larger than the Lapps, or the ancient Gauls. We learn, also, that the English cranial capacity is likewise inferior to the Siamese or Chinese, to the Kafirs and Zulus, and to many of the Polynesians. Taking the deduction of Welcker that the membranes, blood-vessels, &c., occupy from 11·6 to 14 per cent. of the interior, the former in small skulls, and the proportionate weight increasing, this would indicate the brains of these races as larger than the average British brain. A large brain is not, therefore, necessarily an index of great mental power, a fact sufficiently obvious, even to unprofessional eyes, to justify the vulgar proverb, "big head, little wit;" and, even though Zulus do exceed us in cerebral development, the instances are but few, in which they will succeed in excelling the intellectual and logical capacity of the brain of a Briton.

Of other anatomical features the ossification of the tissue around the basicranial prolongation of the notochord, the third condyle of Halbertsma and Meckel, is noticed as existing once in sixty instances, and the transverse malar suture, described by Sömmerring and Garbiglietti, in three cases in the entire collection. Symmetrical Wormian bones on either side of the frontal occurred in one instance. Another example of this has fallen under our notice. The presence of a single nasal has been recorded in two cases, and the absence of these bones in two others, and the peculiar prolongation of the middle spur of the pterygoid plate backwards and outwards to join the styloid process of the sphenoid bone is noticed in seven instances. This spur is described accurately by Professor Hyrtl, of Vienna, and is mentioned by him as very rare. Its nature is easily understood, as it is merely the normal pterygo-spinous ligament of Civinini ossified. We have met with this anomaly in but one instance, and its degree of frequency would seem from the catalogue to be in the proportion of once in two hundred and seven crania.

The classification of crania is attended with many difficulties, and has been attempted upon different bases, each having features of value. The division into phænozygous and cryptozygous of Busk is useful in determining the lateral extension of the tempora, the former name denoting those skulls whose zygomata are visible when the skull is viewed from above, or in its norma verticalis. The cryptozygous are those whose zygomatic arches are hidden when the skull is examined in the same manner. But the classification proposed by Professor Huxley—(Notes upon the human remains from Keiss in *Laing's Pre-historic Remains of Caithness*, p. 85)—depending on the cephalic index, or the proportion of the breadth to the length, the latter being taken as 1·00, gives us the simplest and clearest ideas of the affinities of crania in general. All those whose cranial index is above ·80 are Brachy-cephalic or short-headed, all below are Dolicho-cephalic. The former are again divided into those at or above ·85, called Brachisto-cephalic, and those from ·85 to ·80, or Eury-cephalic. The Dolicho-cephalic are again grouped into those from ·80 to ·77, sub-Brachy-cephalic; from ·77 to ·74. Ortho-cephalic; from ·74 to ·71, Meco-cephalic; ·71 *et infra*, Mecisto-cephalic.

An important series of anatomical peculiarities in the cranium depends on the premature consolidation or synostosis of some of the sutures, and this has given rise to many deformities, and has been

the subject of many memoirs. On the subject of synostosis all anatomists are by no means agreed; and it is important in a valuable contribution to science like the present to find what place in the controversy is taken by the author. Dr. Davis has already published many of his views on synostosis, in connexion with the the celebrated Neanderthal cranium, whose peculiarities he explains on the ground of premature sutural consolidation, which he regards as a power competent to produce very great variety in cranial form. At the same time he gives in the catalogue fifteen cases of synostosis, of the sagittal and neighbouring suture at comparatively early ages with no deformity, and fifty-seven instances of deformities, the result of premature bony union. There is no doubt that the premature union of two bones can cause some amount of deformity, provided that union puts a period to subsequent extension; but in computing the effects of such unions we must endeavour to ascertain the influence upon bony growth of the original situation of ossific centres. When ossific centres are close together, they have a greater tendency to coalescence than when at a distance, and are usually placed at a greater angle the one from the other. In forty skulls measured by the reviewer, to ascertain the average distances of the centres of the parietal tubera, the one from the other, he found that the maximum distance was seven inches, the minimum an inch and a half; and he also found that the instances of sagittal synostosis presenting deformity had these centres nearer to each other than those examples of synostosis with no deformity or instances of an open suture; and in two Scapho-cephalic crania, evidences of parietal tubera were found placed, each less than three quarters of an inch from the median line. The theory that early synostosis might possibly be a race characteristic was first broached by Dr. Minchin in this Journal, November, 1856, and was supported by Dr. Thurnam (*Nat. Hist. Review*, 1865, p. 242), and Von Baer (*Die Makrokephalen, &c.*, 1860). The first named gentleman directed attention to the description of the Macro-cephali inhabiting the shores of the Euxine, as given by Hippocrates, and suggests that their elongated crania owed this form to a premature (probably fetal) synostosis of the sagittal suture producing a uniparietal bone. Dr. Thurnam has observed that one series of ancient British crania displayed synostosis as a very common character; and he also noticed that in African skulls the same condition was very common. Both these opinions are referred to by Dr. Davis, who

has also given some observations of his own on the same subject. At p. 38, he says: "Synostotic distortions are well known to be abnormal, and afford no support whatever to the hypothesis of Dr. H. Minchin that Scapho-cephalism or Macro-cephalism might be the heritage of the ancient tribe mentioned by Hippocrates, who dwelt on the shores of the Black Sea." And again, he refers to Dr. Thurnam's view at p. 10. How Dr. Davis can reconcile his sweeping denunciation of the abnormalty and non-characteristic nature of Scaphocephalism with his own description, p. 311, is more than one can easily understand; for in that page, describing skull No. 817, Fatean, he says: "This is, perhaps, the finest and most characteristic specimen of that specific type of skull met with among these races, and not to be found in any other part of the world. Its extraordinary length, narrowness, and height are seen by the measurements. * * * Indeed, it indicates the measurements of a Scaphocephalic skull, although the sutures are all patent in this admirable example. *Here Scapho-cephalism becomes as it were a race-character.*" This seems, certainly, to an ordinary reader like a contradiction; but the learned author may, perhaps, have some occult method of reconciliation, by which the two statements may be harmonized. But enough of this.

The anatomical points referred to in the book will thus be seen to present to us many facts of deep interest, well deserving of the attention of all practical anatomists. But the book has another aspect, the ethnological, in which it requires our notice. Dr. Davis is an advocate for the plurality of races, and brings out his belief in many parts of the book; and, as this subject is one fraught with the deepest interest, it would be worth examining the grounds of such an opinion. For this purpose, we cannot do better than make a careful comparison of diverse skulls, upon the data furnished to us by Dr. Davis, in order to see whether the basis of his belief, as given in the book, bear examination.

No.	A	B	C	*a*	*b*	*c*	D	E	F	*a*	*b*	*c*	G	*a*	*b*	*c*	H	I	J	K
98	82·6	21·2	15·	5·	5·2	4·8	15·2	7·5	5·6	4·8	5·1	4·4	5·5	4·9	4·2	4·2	—	—	·74	·73
1228	81·	21·	15·2	5·2	5·	5·	15·3	7·4	5·4	4·7	5·	4·1	5·9	5·	5·1	4·5	--	5·4	·73	·79
840	72·	20·2	14·4	4·8	5·	4·6	14·2	7·2	5·4	4·4	5·1	4·4	5·2	4·6	4·7	4·	4·8	5·4	·75	·72
764	72·	20·1	14·3	4·8	4·8	4·7	14·4	7·	5·4	4·6	5·	4·1	5·3	4·5	4·6	3·7	4·6	5·	·77	·75
1016	70·	20·	14·4	4·6	4·4	5·4	15·	6·9	5·4	4·5	4·6	4·5	5·4	4·6	5·	4·4	—	5·3	·78	·78
116	70·	19·8	14·5	4·7	5·2	4·6	14·1	7.	5·4	4·2	5·2	4·2	5·2	4·3	4·6	4·2	—	5·	·77	·74
1178	73·	20·2	14·6	5·4	5·	4·2	14·2	7·1	5·2	4·4	4·6	5.6	5·1	4·6	4·6	4·1	4·7	5·	·73	·71
599	74·	20·5	14·7	5·2	5·	4·5	14·6	7·1	5·5	4·6	5·3	4·5	5·5	4·7	4·9	4·2	4·8	5·1	·77	·77
15	72·5	20·	14·	4·9	4·5	4·6	14·6	7·	5·5	4·5	5·	4·	5·6	4·5	4·7	3·9	—	5·6	·78	·80
1236	66·	20·3	14·1	4·7	5·	4·4	14·7	7·1	5·3	4·5	4·7	4·3	5·3	4·5	4·8	4·	—	5·2	·74	.74

In this table, which consists of examples taken nearly at random, at least selected with very little care, it will be seen that the first and second bear a closer relationship to each other in most respects than to any of the others, the differences being but 1·6 in capacity, ·2 in circumference, &c.; and yet, 98 is the cranium of an ancient Briton, and 1228 is the skull of an inhabitant of Dahomey. Again 840 and 764 present no differences of importance in dimensions, and the former is the skull of a female Canadian Mississaga Indian, and the latter is that of a Scottish female. The third pair are, respectively, the skulls of an Englishman and a Chinaman from Ningpo. The crania of the fourth pair are 1178, the skull of an Italian, and 599, a Polynesian, from the Island of Uahuga, of the Marquesas group. No. 15, a Maori, resembles closely 764 and 840; while 1230 does not resemble 1228, although both are the skulls of Dahomans.

There is no intelligent man who has ever devoted even a short time to the examination of a collection of skulls of different nations but who has come to the conclusion that there are great general features which are characteristic of the leading divisions of the human race, but a close study will convince any one possessed of an average reasoning capacity, that between the crania of every group and its neighbours, links intermediate occur so numerously as to preclude the possibility of drawing strong lines of demarcation between the various tribes, for the differences between the skulls of the most diverse races of mankind are not nearly as great in degree as the differences between the crania of a King Charles spaniel and that of a mastiff or a greyhound. The principle which Mr. Darwin has so fully illustrated that one species is subject to variation when influenced by external causes, is one which we cannot help applying to the human race, for in it we have a striking exemplification of the great law of nature, unity in variety. A careful examination of the measurements in this book will lead any unprejudiced observer to the conclusion that, whatever evidences may be afforded by collateral sciences in favour of the multiplicity of species in the human family, the examination of skulls gives to us proof of nothing beyond the variation which we would be prepared to meet with in the bony skeleton of individuals of one species.

Many other interesting points are touched on in this comprehensive volume. The influence of Micro-cephaly upon the moral faculties is referred to in several places, in connexion with the skulls of

convicts. The work is illustrated with numerous expressive woodcuts, which enhance its value very considerably; and, on the whole, it may be regarded as a most valuable contribution to literature, which should be in the library of every anatomist, ethnologist, or zoologist.

WORKS ON DIGESTION.

1. *A Treatise on the Function of Digestion; its Disorders, and their Treatment.* By F. W. Pavy, M.D., F.R.S.; Fellow of the Royal College of Physicians; Senior Assistant-Physician to, and Lecturer on Physiology at, Guy's Hospital. London: John Churchill and Sons, New Burlington-street. 1867.

2. *On the Diagnosis and Treatment of the Varieties of Dyspepsia Considered in Relation to the Pathological Origin of the Different Forms of Indigestion.* By Wilson Fox, M.D., Lond.; F.R.C.P., &c. Second edition. London: Macmillan. 1867.

Dr. Pavy's work will be read with interest both by the physiologist and the physician. It contains an excellent and very complete summary of the state of our knowledge regarding the physiology of digestion. To this subject the author has himself made important contributions, and the present volume contains a considerable amount of original matter, the fruit of his own observation and experiments.

The portions of the work devoted to the derangements of digestion are not so full as those which treat of the normal process, nor is there much that is novel contained in them; but the descriptions of symptoms are clear and concise, and the remarks on treatment judicious. The basis of the treatise being physiological, the functional derangements of the digestive process are considered in connexion with the normal operations from which they are departures. The titles of the different sections will give a clear idea of the scope and arrangement of the work. They are as follow:—Prehension and Ingestion; Mastication; Insalivation; Deglutition; Difficulty of Swallowing, or Dysphagia; Gastric Digestion; Vomiting; Eructation—Rumination; Perverted Appetite; Pain and other Morbid Sensations connected with the Stomach; Flatulence; Heartburn; Water-brash; Acidity; Intestinal Digestion; Colic—Enteralgia; Intestinal Flatulence—Tympanites; Diarrhea; Constipation.

Structural changes in the digestive organs are not described, and the author expresses this opinion, that pathology has thrown little light upon digestive disturbances—an opinion which we venture to hope the progress of investigation will soon render no longer tenable, and which even already the researches of Handfield Jones, Fenwick, and the author of the other work named at the beginning of this article, as well as those of other observers, have gone some way to disprove.

Gastric Digestion is treated at some length, and the section devoted to it contains several observations of considerable importance. With reference to the value of pepsine—an agent now extensively employed in the treatment of some forms of indigestion—the author is very sceptical. He states that it is found in abundance in the stomachs of persons who have died even from protracted disease of different kinds—a fact which, if it be established, would point to the conclusion that it is not owing to a deficiency of this principle that the impaired condition of the digestion found in these affections is owing, and which suggests serious doubts as to its therapeutical efficacy in many of the cases in which it is usually administered. The stomachs examined were from subjects in whom the causes of death had been so widely different, as typhoid fever, phthisis, apoplexy, lardaceous disease, lithotomy, ovarian disease, and heart disease, with typhoid symptoms. On the other hand, we may remark, the observations of Fenwick, detailed in his recent work on the stomach and duodenum, and which were made with special reference to this point, are in direct opposition to the results obtained by Dr. Pavy. Fenwick found that the amount of pepsine, estimated by its solvent power on albumen, was much diminished in several instances of disease; for example, in heart disease, accompanied by congestion of the gastric mucous membrane, and in cancer. The whole subject of the formation of this organic principle and of the conditions which modify its quantity and quality, requires further investigation.

With regard to the quality of the pepsine which is used for medical purposes, we find the following observations:—

"Seeing that pepsine happens to be always present in the mucous layer at the surface of the stomach, doubts may not unreasonably be entertained regarding the utility of, or the reality of any assistance to be derived from its administration. It may be admitted, however, as possible that in some cases the pepsine in the stomach may be deficient in quantity or defective in quality, and that service may be derived from its

administration with the food: but for this to be the case, it stands to reason that the pepsine employed must be in an effective condition. Now, speaking from the examination of several specimens of pepsine procured from some of the largest pharmaceutical establishments in London, the bulk of that which is sold is totally devoid of any active property. Whether this arises from too much heat having been employed in its preparation, or from whatever cause, the fact remains that the chief portion of the pepsine sold and administered, being perfectly inert as a digestive principle, is destitute of any real value as an agent for affording assistance towards the performance of digestion. Whatever benefit, therefore, has seemed to accrue from the employment of such a preparation, must have arisen from its influence on the mind rather than on the process of digestion."[a]

The interesting question of why the stomach is not itself digested by the fluids which it contains, while substances of a composition identical with its own are rapidly acted on when introduced into its cavity, is discussed with much ability, and some highly interesting experiments of the author are detailed.

It is well known that Hunter attributed the immunity possessed by the walls of the stomach during life to the influence of what he called "the living principle." He regarded the extinction of this living principle at death as the cause of the *post mortem* solution of the stomach which is so often observed, and believed that if a portion of a living animal—the hand, for instance—while still in organic connexion with the body, could be introduced into the stomach of another animal during digestion, there would not be any effect produced on it by the gastric juice. This notion of Hunter was brought to the test of direct experiment by Bernard, and found to be altogether fallacious. Bernard introduced, and the experiment has been repeated with similar results by Dr. Pavy, the hind legs of a living frog into the stomach of a dog while digestion was going on in the latter, and found that the tissues of the frog yielded to the action of the gastric juice, and were dissolved by it, although the animal remained alive. An experiment of a kindred nature has also been performed by Pavy, in which the ear of a rabbit was substituted for the frog, and with the same result, a portion of the ear being almost entirely removed by the solvent action of the gastric juice.

[a] In the "Gulstonian Lectures," vide "Lancet," April 25th, 1863, I mentioned the sources from whence I obtained the specimens of pepsine referred to. It is but justice to state that Messrs. Bullock and Reynolds' pig pepsine was found to possess very active properties.

The explanation offered by Bernard to account for the immunity of the stomach is regarded by Dr. Pavy as unsatisfactory and insufficient. Bernard's opinion is that the protection is afforded by the constant renewal of the epithelium, which covers the stomach; and that when death takes place the solution of the stomach, which then frequently occurs, is owing to the non-renewal of this protecting layer. The following remarks are made by the author on this question:—

"Experiment shows that the explanation which refers the escape of the stomach from destruction by its own secretion during life to a protective influence exerted by its epithelial layer, will no more stand investigation than the 'living principle.' I have found ('On the Immunity enjoyed by the Stomach from being digested by its own Secretion during Life,' 'Transactions of the Royal Society,' 1863) that the excision of a patch of mucous membrane from the stomach of a living animal is not followed by digestion of the subjacent parts, and thence perforation—phenomena that would be looked for if the protection were owing to the epithelial layer. Digestion goes on in such a stomach without the structures opposite the denuded part exhibiting any evidence of attack. The walls here evince no signs whatever of enjoying less security than elsewhere; and on the animal being allowed to live, I have found that repair by cicatrization has ultimately completely taken place.

"Independently of the evidence afforded by experiment, it may be assumed, upon reflection, that something more constant—some condition presenting less exposure to the chance of being influenced by external circumstances—than that resting upon the existence of an epithelial covering, is required to account for the remarkable security from destruction by its own secretion which the stomach is found to enjoy during life. From the position the stomach occupies as a receptacle for everything that may chance to get swallowed, it can hardly escape having its mucous membrane occasionally abraded; and yet its integrity is found to be maintained. Ulceration of the stomach, also, is not of uncommon occurrence; but it does not necessarily lead to perforation as a result. Perforation, it is true, does sometimes occur as a consequence of ulceration; but the same event is noticeable in the case of other parts of the alimentary tract, and there is no reason to regard it in the stomach, more than elsewhere, as due to anything besides the ordinary progress of the ulcerative process."

The theory advocated by the author in the following quotation is open to some obvious objections, but is certainly highly ingenious. It affords a plausible explanation of the difficulty which

has puzzled so many physiologists, and it has been favourably received by many competent authorities:—

"The question, it must be considered, then, as to how it happens that the stomach, composed as it is of digestible materials, escapes during life being digested itself whilst digestion is being carried on in its interior, still remains, as far as the explanations already referred to are concerned, an open one for solution. It is evident, upon consideration, that whatever explanation claiming any pretensions to sufficiency is given must comprise some broad principle of action capable of providing against all contingencies—capable of affording, in fact, that uninterrupted security during life which, upon looking around us, we observe the stomach to enjoy.

"The view that I have offered ('Philos. Trans.,' 1863) is founded upon the permeation of the walls of the stomach by an alkaline current of blood; and this agrees with the principle I have laid down as indispensable, for the circulation of blood forms with us one of the essential conditions of life. It will not be disputed that the existence of acidity constitutes a necessary condition for the accomplishment of gastric digestion. Alkalinity is also a constant character of the blood. Now, the walls of the stomach being everywhere permeated by a current of alkaline blood, an opposing influence is raised to the occurrence of digestion. The gastric juice, it may be considered, is constantly tending to penetrate and act upon the stomach, as well as upon the food contained in its cavity; but attack upon the stomach is prevented by the destruction of solvent power that is induced by the neutralizing influence exerted by the current of alkaline blood which happens to be always flowing through the gastric walls during life.

"This view will be found to be perfectly reconcilable with the yielding of the stomach to the digestive influence of its secretion that is noticed to occur after death. As death takes place, the circulation is stopped, and the protecting influence is lost that it afforded during life. There is only the blood that is stagnant in the vessels to exert a neutralizing effect; and should death happen to take place at a period of digestion, the neutralizing capacity of this will be altogether inadequate to prevent the gastric juice that is present attacking the stomach as well as its contents. Digestion of both stomach and its contents proceeds as long as the temperature is kept up to a suitable degree for the purpose, and the solvent power of the gastric juice remains unexhausted.

"In the special arrangement of the vascular distribution that is found to exist in the mucous membrane of the stomach, security, according to the view I have propounded, seems to have been rendered, as it were, doubly secure by the doubly effective barrier that may be said to have been provided against the progress of digestion. At the surface of the

stomach there exists a closely-woven plexus of capacious capillaries, which, as has been previously pointed out, derive their blood, not from arteries, but from the capillaries which course upwards between the gastric tubules. Now, it is from the blood circulating in the capillaries between the tubules that the acid constituent of the gastric juice is drawn ; and it follows, therefore, that in proportion as acid is separated here, the blood circulating in the capillaries at the surface must be correspondingly increased in alkalinity. Thus, it will be remarked, not only is the alkalinity of the blood greatest just where alkalinity is most wanted for its protecting influence—viz., at the surface—but in proportion as acid flows into the stomach and creates a demand for a protecting influence, so is the blood circulating at the surface rendered more alkaline, and thereby more efficacious as a protecting medium. Looking at nature's arrangement, the act creating a demand for the exercise of neutralizing action enhances the character of the neutralizing capacity provided."

Besides these considerations, direct experiments are brought forward as tending to establish this view. The author has found that solution and perforation of the stomach may be brought about during life by arresting the circulation in the stomach, or by pinching up and ligaturing a portion of its walls so as to cause the constricted portion to project into the cavity of the organ. The objections to the theory propounded are also noticed with candour, and fairly discussed. Indeed, the entire chapter deserves the careful study of all interested in this difficult and much-discussed problem. Intestinal digestion is the subject of an article of some length, and the functions of the liver and pancreas are detailed with much completeness.

A suggestion regarding the production of an article of food for invalids, by having meat artificially digested before it is taken, seems to us to possess some practical value. The author has succeeded by means of the action of a mixture of pepsine and hydrochloric acid on meat in producing an extract which equals about the third of the weight of the meat employed in its preparation, and in which the nitrogenized alimentary principles are dissolved, and are, besides, rendered diffusible, so as to be capable of being readily absorbed into the system. An analogous process has also been recommended by Dr. Marcet, and it seems likely, if the product can be rendered sufficiently palatable to be taken without repugnance by invalids, to be of real advantage in cases of weak digestion.

We can heartily recommend this work as giving a clear, simple,

and thoroughly scientific account of the subject of which it treats, to everyone who wishes to become familiar with the latest advances in the physiology of digestion.

In the work which stands next on our list, and which has rapidly reached a second edition, Dr. Wilson Fox examines the subject of dyspepsia from an altogether different point of view. He groups together all the forms of indigestion under three great heads:—

1. Atonic dyspepsia.
2. Neuroses of the stomach.
3. Inflammatory dyspepsia, or gastric catarrh, which may be either acute or chronic.

Much stress is justly laid on the frequency with which abnormal conditions of structure are met with in cases of indigestion. There can be no doubt that morbid changes of the stomach have been and are often overlooked in *post mortem* examinations. This arises partly from the difficulties which are inseparable from the examination of an organ which is specially liable to *post mortem* changes; partly from the fact that careful microscopical investigation is, in many cases at least, necessary for the determination of the nature of its alterations—a process which requires an amount of time and skill not generally available; and in a great measure, also, from the few opportunities which pathologists can obtain of examining the condition of the stomach in minor forms of disease. Observations on the subject are, nevertheless, beginning to multiply, and there is reasonable ground for the expectation that the catalogue of functional disorders of the stomach will ultimately undergo the same process of abbreviation which has already taken place in the case of so many other organs.

The whole tendency of recent observation has been steadily in this direction, and the present work contains the results of numerous investigations, which go some way towards the establishing of a more accurate and more extended knowledge of the pathological changes which occur in this organ. In this regard we look upon the volume as possessing much value. The descriptions and illustrations of diseased states which it contains will be found to be replete with interest to those who have studied the morbid anatomy of the stomach. Dr. Wilson Fox had himself previously published some important contributions to this subject, and he has availed himself fully of the labours of his fellow-workers in the same field.

Of the etiology, symptomatology, diagnosis, and treatment of dyspepsia, we have a very full and elaborate account. Indeed, some points are treated with an almost superfluous amount of detail, and with, perhaps, a slight tendency to over-refinement. Students, however, seeking a guide through the intricacies of this most complicated and difficult branch of medicine will not object to this; and they will derive advantage from the multiplied references to authorities which will enable them to form an idea of the mass of works which treat of stomachic diseases, and of the immense industry and research which Dr. Wilson Fox has devoted to the study of the literature of the subject.

We cannot avoid a reference to a point of some practical importance with regard to diet, in which Dr. Wilson Fox seems to us to have fallen into a serious error. He states (p. 102) that starchy foods are objectionable in cases where pyrexia is present, because the secretion of saliva is much diminished, and consequently the starch passes unchanged into the stomach, and is not only useless for nutrition, but by undergoing the acetous or lactic fermentation, may become injurious. This observation, into which he seems to have been led by a misapprehension of some remarks made by Dr. T. K. Chambers, is, in our opinion, altogether erroneous. The experience of every physician, as well as the instinct of patients, is strongly in favour of the value of these foods in the condition alluded to. A cup of thin arrow-root, or some kindred article of diet, is certainly not only agreeable, but, as far as the sensations of the patient can be taken as a guide, highly useful in cases of pyrexia, and in our experience its administration has not been followed by any prejudicial results. But even from a physiological point of view Dr. Wilson Fox's statement is curiously contrary to the fact. Not to mention that the secretion of gastric juice is diminished as well as that of saliva, so that on this ground albuminous foods also might be forbidden, it has been found that the digestion of starch can be thoroughly accomplished in the small intestine, the pancreatic secretion possessing even greater power than the saliva of converting starch into sugar. Again, chemically, it is not possible that starch can undergo either the acetous or the lactic fermentation without having been previously rendered soluble, and consequently capable of being easily absorbed into the system. Indeed, we may go further, and say that it must actually be converted into sugar. This change, which is precisely that brought about by the action of the saliva, being,

as far as we know, an essential preliminary to the further changes which take place during the process of fermentation.

We have alluded to this point because it is one of much practical interest, and because the generally judicious character of the recommendations of Dr. Wilson Fox on the subject of treatment makes this oversight the more remarkable.

We have said enough, even in this short notice, to show the high opinion which we entertain of the merit of the work, and of the learning and acuteness displayed by the author.

On the Physiological Action of the Calabar Bean (Physostigma Venenosum, Balf.) By THOMAS R. FRASER M.D., Assistant to the Professor of Materia Medica in the University of Edinburgh. 4to, pp. 73. Edinburgh: 1867.

THIS large tractate was read before the Royal Society of Edinburgh on the 17th of December, 1866, and it forms Art. XLVIII. of the Transactions of the Society for that year.

In 1862 Dr. Fraser wrote a graduation thesis on the "Characters, Actions, and Therapeutic Uses of the Ordeal Bean of Calabar," and states that the principal results which he obtained at that time were that this substance causes death by either syncope or asphyxia, the latter being due to an effect on the spinal cord and the respiratory centres; that the symptoms resemble those of cardiac or pulmonary embarrassment, according to the quantity of the poison administered, and to its rate of absorption; and, also, that the topical application of this agent to the eyeball, or to its neighbourhood, produces a marked and rapid contraction of the pupil, and various disturbances of vision. "The present investigation" (writes Dr. Fraser) "was undertaken for the purpose of extending and supporting my previous results, with some of which subsequent observers have disagreed." The effects which follow the topical application to the eyeball are "merely alluded to in this paper, as this portion of the subject has not been completed."

With few exceptions the experiments recorded in this volume—and they were so many as 103—were made with the common frog, birds, and various mammals. Fatal results were produced on birds with the smallest quantity, while the largest doses, in proportion to weight, were required to kill amphibia. "A dose of one-sixteenth

of a grain proved rapidly fatal to a pigeon weighing nine ounces and three quarters; whereas a frog, which weighed 726 grains, has recovered from three grains of extract—a quantity sufficient to produce death in a dog of average size." The first experiment was made on a healthy dog, with the result of proving that prolonged digestion with gastric juice does not impair the energy of Calabar bean. It is thus described on page 3:—

"A gastric fistula was formed in a healthy dog, and, some days afterwards, and while the animal was in good health, 500 grains of gastric juice were withdrawn from the stomach. Four hundred grains of this were mixed with half a grain of extract of physostigma, received in a flask with an arrangement to impede evaporation, and placed in a water-oven at a temperature of 98° F. The digestion was continued for twenty-four hours, when the fluid was placed in a capsule and evaporated at 85° F. The resulting extract was finely pulverized, heated with alcohol of 85 per cent., filtered, and again evaporated to dryness. Contact with distilled water removed an acid fluid, which was made alkaline by excess of magnesia, and agitated in a bottle with chloroform. The chloroformic solution was removed by a separating funnel and evaporated, and the resulting brown extract was suspended in distilled water. A drop of this was applied to the conjunctiva over the right eyeball of a rabbit, whose pupil, before the experiment, measured $\frac{1}{50}$ths × $\frac{1}{50}$ths of an inch. In eight minutes, the pupil was $\frac{8}{50}$ths × $\frac{12}{50}$ths; in fifteen minutes, $\frac{6}{50}$ths × $\frac{8}{50}$ths; in twenty minutes, $\frac{4}{50}$ths × $\frac{5}{50}$ths, and it continued in this contracted condition for many hours. The remainder of the fluid was injected under the skin of a young pigeon, and caused its death in eight minutes.

"Several small pieces of hard-boiled white of egg were placed in a flask with the remaining 100 grains of gastric juice, and digested under exactly the same conditions, and at the same time, as the extract of physostigma. They were found to be completely dissolved in less than ten hours. There could, therefore, be no doubt as to the activity of the gastric juice which had been employed."

The following is an abstract of some of Dr. Fraser's principal conclusions as to the action of this poison through the blood:—

1. Physostigma has proved fatal to every animal hitherto examined, with the exception of the Eserĕ moth.

2. The contact of the extract with the gastric juice of a dog, for twenty-four hours and at a temperature a little above 95° F., did not modify the energy of the poison.

3. A large dose, given to a mammal or bird, rapidly affects the

cardiac contractions, and then paralyses the heart. The respiratory movements are quickly stopped, but the symptoms and *post mortem* appearances are those of syncope. Such a dose, injected into the abdominal cavity of a frog, affects nearly simultaneously the heart and spinal cord, and very rapidly destroys the vitality of both organs.

4. In mammals and birds, an average dose produces symptoms of asphyxia. When administered to frogs, a similar dose impairs the function of the spinal cord, and diminishes the rates of the cardiac contractions and of the respiratory movements; and, soon after, the latter cease.

5. When a small dose is administered to a frog, the effects are the same as those in the previous conclusion, until they arrive at the stage of paralysis of the motor nerves; after this, an interval of several hours may elapse before the functions of the spinal cord are completely suspended. During this interval the *tactile* sensibility of the afferent nerves is increased.

6. *With a smaller dose, a frog may have its cardiac contractions reduced by from seventy to eight per minute, its respiratory movements completely stopped, and the endorgans of its motor nerves paralysed, and yet afterwards completely recover.*

7. In frogs, the voluntary muscles are unaffected by the poison, and may continue to respond to galvanic stimulation during three or four days after its administration.

8. In mammals and birds, the voluntary muscles are affected in a very remarkable manner. At an early stage of the poisoning, faint twitches occur, which gradually extend over the body, and, at the same time, increase in vigour so as to interfere with the respiratory movements. Shortly before death, they again become mere successive twitches, often requiring the use of the hand to discover their existence. After death, if a muscular surface be exposed, these twitches will still be observed, involving usually different muscular fasciculi at different times, rarely the whole of a muscle at once; and in mammals they may persist for more than thirty minutes after death.

9. In mammals and birds, when the dose is large, the heart's action is rapidly made slower and then stopped. In dogs, it may diminish to one-half in three minutes, and cease in ten. In frogs also, a large dose, injected into the abdominal cavity, causes rapid and complete cardiac paralysis.

10. The pneumo-gastric nerves retain their inhibitory power over the heart during the whole time from the diminution to the partial recovery of its action.

11. Division of the pneumo-gastric nerves, or their paralysis by curare, or destruction of the medulla oblongata or spinalis, does not protect the heart from the action of physostigma.

12. The lymphatic hearts of frogs poisoned by Calabar bean soon cease to contract.

13. In rabbits, a large dose paralyses the cervical sympathetic nerves, before the death of the animal.

20. The pupil contracts in all cases of rapid poisoning in mammalians and birds.

21. Calabar bean acts as an excitant of the secretory system.

24. Congestion of internal organs occasionally occurs; but this is by no means an invariable consequence of a fatal dose.

25. The blood is generally dark after death, but becomes arterialized on exposure to the air; its respiratory capabilities are unaltered; it often clots loosely and imperfectly; and, when examined with the spectroscope, the bands of scarlet cruorine are found unchanged.

The paper ends with the following conclusions as to the topical effects of the Calabar bean:—

B. TOPICAL EFFECTS.

1. "When the poison is applied to the surface of a frog's brain, no effect is produced; but when it is brought into contact with the spinal cord, a few twitches occur in the extremities, followed by paralysis of the portion of cord acted upon.

2. "When physostigma is applied to a mixed nerve-trunk, in a concentrated form and with proper precautions to prevent absorption by neighbouring parts, first the afferent nerve-fibres are paralysed, and afterwards the efferent.

3. "Topical application destroys the contractility of striped and of unstriped muscular fibre. The heart's action is stopped by repeated application to its external surface or to the pericardium. If a small quantity be injected into one of its chambers, paralysis nearly immediately follows.

4. "The blood-vessels are dilated when a solution is applied to the web of the frog's foot.

5. "The effects of the application of Calabar bean to the eyeball are a somewhat painful sensation of tension in the ciliary region, contraction of the pupil, myopia, and astigmatism; with, frequently, congestion of the conjunctival vessels, pain in the supra-orbital region, and twitches of the orbicularis palpebrarum muscle."

There is a large amount of minute information in this paper, and much that is curious as well as useful. We must not, however, forget that for the first accurate description of the effects produced by this medicine we are indebted to Professor Christison, who not only examined into its effects on animals, but also on his own person.

The use of the Calabar bean in cholera is yet *sub judice*, but its use in producing contraction of the pupil is an established fact, for which we are indebted to Dr. Fraser and others.

In a few words, Professor Macnamara has thus summed up the state of our knowledge of the effects of this medicine:—"We may accept it as proved that Calabar bean paralyses striped and unstriped muscular fibre; causes dilatation of the blood-vessels; augments the secretions, more especially those of the mucous alimentary glands; contracts the pupils, and in its action is antagonistic to strychnia; in fact, in all these respects it seems to modify the activity of the vaso-motor nervous system."

Le Monde de la Mer. Par ALFRED FREDOL. Illustré de 22 Planches en couleur, de 14 Planches en noir tirées a part, et de 320 Vignettes Intercalées dans le texte. 2me edition. Paris: Hachette et Cie., 1860. Royal, 8vo, pp. 693.

THE preface to this book states that it is the posthumous work of one whose career had been consecrated to scientific research. The author it is said proposed, as a relaxation from his studies, to popularize the science he had cultivated with love, and which was the great passion of his life; and he collected into a natural history, without a barbarous nomenclature, without scientific pretension, without repulsive anatomy, a considerable number of interesting facts and new observations. Struck with admiration at the sight of the *tableau grandiose* of the ocean, touched by the wonderful spectacle of the life of the waters, the author paints the world of the sea in its pomp and its agitations. He describes the living beings poetically and with originality; he shows their developments and metamorphoses, their skill and their industries, their combats and their loves. He dwells on the products of the sea, on the abundance of its fruits, on the utility of its cultivation; at times he descends into the description of organisms, and makes us "admire both the magnificence of execution and the simplicity of design."

This is a very accurate description of the book before us. It is calculated to make the study of natural history popular and attractive. It is written in clear, elegant, and flowing language, and is most abundantly illustrated by some of the most beautifully executed plain and coloured drawings we have ever seen. We cordially commend it to both young and old, to the student and to

the amateur. The illustrations are worth the price of the book, and fit it to be an elegant drawing-room ornament; and the descriptions of the sea and its inhabitants will give an interest in them that will conduce to and lighten the careful study of scientific manuals.

Elements of Chemistry, Theoretical and Practical. By WILLIAM ALLEN MILLER, M.D., LL.D.; Treasurer and Vice-President of the Royal Society; Professor of Chemistry in King's College, London, &c. Part I.—*Chemical Physics.* 643 pages. Part II.—*Inorganic Chemistry.* 884 pages. Part III.—*Organic Chemistry.* 1,012 pages. London: Longmans, Green, Reader, and Dyer. 1867 and 1868.

IT has often been made a subject of reproach to the scientific men of these countries that they have so seldom produced large and comprehensive works on science. The magnificent cyclopedias, dictionaries, and treatises on chemistry, botany, and other experimental and natural sciences issued so frequently from the press of Germany and of France contrast strikingly with the petty works on the same subjects published in the English language. In medical science the case is different. There are numerous works on medicine and surgery, the production of British writers, which are not excelled in the medical literature of the Continent. It is probable that the reason why there are so few of the larger systematic treatises on the natural and experimental sciences issued from the British press is simply the want of a sufficient number of readers. There are, amongst the cultivators of every department of knowledge, Englishmen, Irishmen, and Scotchmen, capable of efficiently writing the most comprehensive works on the particular sciences or arts to which they are devoted; but there are not, as a general rule, sufficient numbers of Englishmen, Irishmen, and Scotchmen, who, by purchasing such books, would render the labours of their authors pecuniarily successful. Just in proportion as the demand for information on any subject increases, so will the means of instruction in that particular subject become more enlarged and more accurate. Within the last twenty years the cultivation of chemistry has received a remarkable development in these countries. The Chemical Society of London has become one of the largest and most distinguished of the scientific institutions of the metropolis.

More than twenty periodicals devote a considerable portion of their space to the consideration of chemical subjects; and a weekly paper is wholly occupied with "chemical news." The increase in the numbers of those who wholly or partially occupy themselves with chemical pursuits has, of course, reacted on the literature of the science, which is now rapidly assuming a respectable status. A magnificent Dictionary of Chemistry is passing through the press, which might vie with any foreign encyclopedia; and we have before us three large volumes, entitled the *Elements of Chemistry*, in which, however, there is a good deal more than the elementary facts of chemical science set forth.

Dr. Miller's *Chemistry* is a work of which the author has every reason to feel proud, and which we are certain that his publisher must find very satisfactory, a new edition being called for and eagerly purchased every third year since the first publication of the work in 1855. It is now by far the largest and most accurately written treatise on chemistry in the English language; and, excepting in the department of analysis, it contains more information relative to that science than most medical practitioners and students ever require to learn. Part I. (which comprises a volume) is wholly devoted to chemical physics, the major portion being occupied with those departments of physics of most interest to the chemist—namely, molecular forces, physical conditions of matter, chrystallography, double refraction and polarization of light, temperature, and specific and latent heat. All of these important subjects are treated with a copiousness of matter and clearness of style that leave nothing to be desired. In the second volume, the properties of the elementary bodies, and of their inorganic combinations are fully described, and the most recent information relative to them given. Indeed, in this and the other parts of his work the author has proved the extent of his reading by the immense number of his references to the most recent investigations of both British and foreign chemists and physicists. The work may, therefore, be fairly regarded as a faithful mirror from which is reflected the present aspect of chemistry and the cognate sciences. In the third part, or volume—which is also the largest—the important department of organic chemistry is almost exhaustively treated.

In the present edition of Miller's *Chemistry*, the unitary system of notation is adopted—partly, in part II.; wholly in parts I. and III. In order, therefore, to make effective use of this work, the reader must be acquainted with Gerhardt's nomenclature and notation,

and discard from his mind the older modes. We fear, however, that the medical practitioner who "took out" his chemistry ten to thirty years ago will not, as a rule, care to spend his time in learning the new language of the science. For the accommodation of this class of his readers—who, we trust, are by no means few—we almost regret that Dr. Miller did not retain the use of the barred letters employed in the third edition to denote the doubling of the atomic weights of those elements, such as oxygen, the so-called equivalents of which had been increased two-fold. However, as changes that are really desirable must be made sooner or later, it is, perhaps, as well that Dr. Miller has now wholly and exclusively adopted the new system, however it may puzzle some of his readers to know what *dihydric tetra thionate* means, though they may possibly divine that *calcic sulphate* is simply sulphate of lime.

Principles of Chemistry, founded on Modern Theories. By A. NAQUET, Professeur Agregé a la Faculté de Médecine de Paris. Translated from the Second Edition, by WILLIAM CORTIS; Revised by THOMAS STEVENSON, M.D., London. Henry Renshaw, 356, Strand, London. 1868. 848 pages.

THIS is one of the most remarkable works on experimental science which we have seen for a long time. It is essentially an exposition and defence of those modern theories of chemistry so ably propounded by Gerhardt and his followers, and which are now gradually but surely gaining acceptance wherever the science is cultivated. Although these modern theories were first proposed in France, it is remarkable that the French chemists were the last to adopt them. In these countries the unitary system of notation has been for a few years past generally, if not universally, employed by writers of original memoirs, contributed to the purely scientific journals. It is now used by some of the educational bodies who hold examinations in this science; and the majority of teachers have adopted it. In all the works on chemistry that have recently been published the new nomenclature and notation are either partially or exclusively employed. In Germany, and even in Italy, the old theories have, as a rule, been supplanted by the new. France has hitherto, notwithstanding its revolutionary tendencies, adhered closely to the *old regime*. Three or four years ago, one of the most distinguished of

the French chemists, M. Wurtz, produced a remarkable work, entitled *Leçons de Philosophiè Chèmique*, in which he strongly advocated the general adoption of Gerhardt's views, with those necessary modifications which the remarkable advance in organic chemistry during the last ten years had rendered necessary. M. Naquet's work is intended to popularize a knowledge of the new theories of chemistry amongst those classes of students to whom the high price of Wurtz's work renders it a sealed volume. Naquet's chemistry is, therefore, not merely an explanation and vindication of the new views relative to the constitution of chemical substances—it is also an ordinary manual in which the students of medicine will find more practical information than the great majority of them will probably find time to store their minds with. At the same time it is evident that the great merit of this work lies in the purely theoretical parts, in which respect it will be found more novel, and, perhaps, more useful than any other book in an English garb.

Those who doubt the value of an esoteric method of teaching chemical science, could hardly read Naquet's work, with an unprejudiced eye, and remain unconverted to his views. His reasoning is so cogent, his deductions are so well sustained on facts, and his arguments are so convincing, that he cannot fail to carry his reader with him. We believe that his book will mainly contribute to revolutionize the method of teaching chemistry in the educational institutions of France, and it will probably help to convince the few British chemists who still pin their faith to the old theories that the modern ones are more rational and simple.

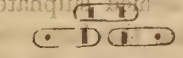
In this work we find perfectly refuted the argument which those who oppose the new notation have most effectively employed against it—namely, that it assumes the creation of hundreds, indeed, thousands, of substances, not one of which has been isolated. For example, sulphuric acid, SO_3, and potash, KO, have each an independent existence, and when they combine the body which results from their union is termed sulphate of potash, KO, SO_3. According to the new notation this latter body is termed sulphate of *potassium*, and its formula is written $K_2\,SO_4$—the atomic weight of sulphur and oxygen being doubled. It is not, however, necessary to assume that any such body as SO_4 exists. Sulphuric acid in its ordinary state is composed of $SO_4\,H_2$. It is a dibasic acid, and its atomic constitution is best shown by the following formula:—

$\left(SO^2\left\{\begin{matrix}OH\\OH\end{matrix}\right.\right)$. Bases are hydrates of metals (simple radicles), or of

compound radicles; and both simple and compound radicles are basyles. Potash is, therefore, the *hydrate of* (the basyle) *potassium*, and *not* the *oxide* of that metal. All acids contain hydrogen, which admits of being wholly or partially replaced by atoms of other basyles—metals. When half the hydrogen of sulphuric dihydride (sulphuric acid) is replaced by a metal, the resultant salt is acid; and when the whole of the hydrogen is replaced by a metal, the salt is neutral. Thus, the action of potash on sulphuric dihydride produces sulphate of potassium—$\left(SO^2 \begin{Bmatrix} OK \\ OK \end{Bmatrix}\right)$ and bisulphate of potassium—$\left(SO^2 \begin{Bmatrix} OK \\ OH \end{Bmatrix}\right)$ in neither of which the existence of any such body as SO^4 is assumed. In the same way we may describe the constitution of other salts that are not acid, such as, for example, the alkaline carbonate of potassium—$\left(\begin{matrix} CO \\ K \end{matrix}\right\} O^2\Big)$ and the bicarbonate of potassium—$\left(\begin{matrix} CO \\ K \\ H \end{matrix}\right\} O^2\Big)$

In Naquet's chemistry we find, for the first time, largely employed the admirable diagrams, constructed by Kékulé, for the purpose of explaining, in a mechanical manner, so to speak, the modes by which the atoms of matter are arranged in molecules. For example, the affinities of an atom are fully satisfied when (if it be, say, biatomic,) its two centres of attraction are adapted respectively to a monatomic atom. Such a biatomic atom will be incapable of combining with any other body whatever. For example:—

the elipsoid being the symbol of a biatomic atom, and the circles representing monatomic atoms; the dots mean the centres of attraction or affinity. A non-saturated atom would be thus represented



We object to the use of the barbarous terms, monatomic atom, biatomic atom, &c. There is no occasion for both the adjective and noun, as the simple term monatomic would be sufficiently expressive.

Whilst we find so much to praise in this excellent work, we really can hardly discover anything to criticise. We notice that gelatine is stated to contain three atoms of sulphur. This assertion

we believe to be incorrect, from personal examination of that article; and it does not agree with the analysis of gelatine given in the most recent works. We were somewhat surprised to find a single addendum given, as if, into the first edition (in English) of so large a work only a solitary error could have crept. In the first page we looked at on opening the book we saw another—girconium for zirconium. On the whole, however, it will be found that few books on science have so few blemishes.

WORKS ON CHEMISTRY.

1.—*A Manual of Inorganic Chemistry.* By CHARLES W. ELIOT, Professor of Analytical Chemistry, and FRANK H. STORER, Professor of General Chemistry, in the Massachusets Institute of Technology. Second Edition London: John Van Voorst, 1, Paternoster-row, 1868. 605 pp.

2.—*Introduction to Modern Chemistry, Experimental and Theoretic.* By A. W. HOFMANN, LL.D., F.R.S. London: Walton and Maberly, Gower-street, 1865. 263 pp.

3.—*First Principles of Modern Chemistry.* By U. J. KAY-SHUTTLEWORTH. London: John Churchill and Sons, New Burlington-street, 1868. 214 pp.

4.—*A Course of Practical Chemistry, arranged for the use of Medical Students.* By W. ODLING, M.B., F.R.S., &c. Second Edition. London: Longmans, Green, and Co., 1865, 241 pp.

5.—*A Systematic Handbook of Volumetric Analysis.* By FRANCIS SUTTON, F.C.S. London: John Churchill and Sons, New Burlington-street, 1863. Pp. 282.

6.—*The First Step in Chemistry. A New Method of Teaching the Elements of the Science.* By ROBERT GALLOWAY, F.C.S. Second Edition. London: John Churchill, New Burlington-street, 1868. Pp. 472.

7.—*The Stock-Feeders Manual; the Chemistry of Food in relation to the Feeding and Breeding of Live Stock.* By CHARLES A. CAMERON, M.D., Professor of the Royal College of Surgeons in Ireland, &c. London: Cassell, Petter, Galpin, Ludgate-hill, 1868. Pp. 356.

THERE is no want of elementary books in almost every department of chemistry, and what is better than large numbers, the great

majority of modern chemical treatises are really good, practical, and accurately written works. We have before us seven elementary works of recent publication; and on the title pages of some of them there are names familiarly known to every cultivator of chemical science. The largest of these books is the joint production of two American chemists, Messrs. Eliot and Storer, and is the first English edition of a treatise which for some time past has been held in high estimation in the colleges and schools of the United States. It is confined to inorganic chemistry and laboratory manipulation. The subject of chemical physics, which occupies a large space in most chemical text books, is briefly dismissed in this volume; the authors therefore have been enabled to give descriptions of the properties of the elements and of their combinations with each other, much more detailed than in any book of the size which has come under our notice. For example, in Brande and Taylor's Chemistry—a work of 900 pages—the section on calcium and its compounds occupies twelve pages, whilst twenty pages are devoted to this subject in Eliot and Storer's chemistry. This work is well up to the present state of the science, and throughout it the new notation is exclusively employed. It is illustrated, but not profusely.

Hofmann's Introduction to Experimental and Theoretical Chemistry is an excellent little book, and might with great advantage be read by the student who is not familiar with the new views relative to the chemical combinations. The work is more theoretical than practical; but the high position of its author in the world of science has secured for it a large circulation.

Shuttleworth's *First Principles of Modern Chemistry* is, like Hofmann's work, nearly altogether devoted to nomenclature, notation, atomicity, and other theoretical subjects. It belongs to this year's products of the press, and contains the newest views relative to formulæ. In this work we notice that constant use is made of the graphic formulæ first devised by Crum-Brown, and which the author believes are not open to certain objections which have been urged against the use of Kékulé's diagrams.

Odling's *Practical Chemistry* is a little work admirably adapted for the use of the medical practitioner and student. It contains directions for the detection of inorganic and organic poisons; and the chemistry of the urine and urinary deposits is treated very fully. The book is enriched with numerous woodcuts, which, more especially in the examination of urinary deposits, will be found

very useful to the chemical microscopist. A chapter on dialysis—a process now so extensively employed in the analysis of the contents of stomachs and other complex organic substances—would have made Dr. Odling's book more perfect; but no doubt this defect will be remedied in a future edition. We notice that Dr. Odling adopts the unitary notation, but retains the old atomic weights, This is a half measure which we cannot too strongly condemn. If the dualistic system be abandoned in favour of the unitary method, we see no reason why the new views relative to atomicity should not be adopted. This book is the only one in which the new notation and the old atomic weights are conjointly used; and such a procedure is calculated to embarrass the students who are acquainted solely with the old or with new theories, and it is of no service to those to whom both the dual and unitary systems are familiar.

Sutton's *Handbook of Volumetrical Analysis* is a book which will be found useful by those chemists who desire expeditious methods of conducting quantitative analysis. This method of obtaining numerical analytical results is fast gaining ground, and will, no doubt, sooner or later lead to the abandonment of the tedious processes of filtering solutions, and the drying and weighing of precipitates.

Mr. Galloway's *First Step in Chemistry* is a book which is well adapted to the requirements of beginners in the study of chemistry; but we cannot avoid stating that the greater and the more valuable part of it is composed of direct quotations from other works. We do not believe that in any other scientific manual in the English language are there so many inverted commas to be found. Mr. Galloway not only borrows his facts from the books of other authors, but he makes a wholesale use of their language. The most elementary books are laid under contribution; and even Orr's *Circle of the Sciences* is quoted from! Indeed, this author does not describe in his own words even so simple an instrument as the hydrometer. Notwithstanding the very small merit—or rather the total want of merit—which characterizes Mr. Galloway's book as a mere literary production, it is a work which we strongly recommend; and we are glad to find that this, the fourth edition, is nearly free from the rather numerous errors which disfigured the earlier issues of the *First Step in Chemistry*.

Dr. Cameron's *Stock Feeders' Manual* is a practical treatise on the breeding and feeding of the domesticated animals. The subject of the physiology of the animals of the farm is discussed in the first

portion of the work, and more than 100 pages of it are devoted to the description of the chemical composition and nutritive value of nearly 150 different kinds of food consumed by live stock. This work contains the most recent information relative to the diseases of animals, which render their flesh unwholesome food. Every owner of a cow or horse might with advantage read this useful work.

On Malformations of the Human Heart, &c., with Original Cases and Illustrations. By THOMAS B. PEACOCK, M.D. London: John Churchill and Sons, New Burlington-street. 1866.

THE second edition of Dr. Peacock's well-known work on malformations of the heart has remained for some time unnoticed by us. It is in many respects an improvement on its predecessor, and will be found to present a very complete account of the anomalies of the heart and great vessels. The author has adhered to the arrangement adopted in the first edition, which, although not the most scientific classification, is well suited for the practical treatment of the subject. He has added an account of the most important instances of malformation which have been recorded since 1858. Among these is an interesting case which goes to support the opinion expressed by Laennec, that a patent state of the foramen ovale is not always congenital, but may be produced even in adult life. Laennec believed that the valvular laminæ might be separated, and the aperture opened as a consequence of a blow, a fall, or of violent exertion. This view, which in the first edition of his work Dr Peacock was not inclined to admit, receives corroboration from the case alluded to:—

"It occurred in a female, twenty-four years of age, who had curvature of the spine and deformed chest, but was reported to have been in usual health till a month before her death. She laboured during her illness under great dyspnœa, headache, transient delirium, irregularity of the pulse, coldness, and very marked lividity of the surface, and died comatose. The heart was large, and weighed 12½ oz. avoirdupois. There was great dilatation of the right auricle, ventricle, and pulmonary artery; and the walls of the right ventricle were much hypertrophied, measuring 4½ lines (10·2 mm. ·39 E. in.) in width. The fossa of the foramen ovale was very greatly expanded, and the valve did not

entirely cover it—an aperture existing between its upper edge and the isthmus three lines in width." [a]

The interesting subject of cyanosis has also received some further development. Dr. Peacock, with Rokitansky, Stillé, and others, regards congestion of the venous system as the cause of the discolouration of the surface of the body, which renders the appearance of a cyanotic patient so remarkable. He looks on the degree of discolouration as being more intense in cases of malformation, which allow an intermixture of the venous with the arterial blood. The conclusions at which he arrives are the following:—

"The inferences to be drawn from the facts brought forward appear to be, that, while obstruction to the flow of blood through the lungs or from or into the right ventricle, giving rise to general venous congestion, is the essential cause of cyanosis, the intensity of the lividity and its peculiar colour, are modified by other circumstances.

"The chief of these modifying circumstances are, I believe, the following:—

"1*st*. It is probably necessary to the production of intense cyanosis that, as suggested by Dr. Chevers, the obstruction to the circulation should either have been present before birth, when the capillary vessels are naturally more capacious than in the adult; or, that it should have existed before the full development of the body was attained, and while the entire vascular system was more readily dilatable; or, at least, that it should have been of long duration, so that the capillary vessels may have become greatly expanded.

"2*ndly*. The condition of the integuments also probably materially affects the production of cyanosis. In cases in which the peculiar blue or black colour is observed, the skin is usually very thin and transparent, and the body generally emaciated. Where, on the contrary, the discolouration is rather of a deep rose tint, the patients are not much emaciated or are even in some cases tolerably well nourished; and, where the skin is pallid, there is either no material congestion, or it is masked by the œdematous condition of the integuments.

"3*rdly*, and lastly. There can be no doubt that the intensity and peculiar tint of the cyanosis must be much affected by the colour of the blood in the vessels. Where a very small portion only can be submitted to the influence of the air in the lungs, the whole mass must be of an unusually deep colour, and the hue of the surface generally will be proportionately dark."

[a] Path. Trans. Vol. x., 1858-59, p. 108. This preparation is in the Victoria Park Hospital Museum. A case probably of similar character is described by M. Durozier in the Comptes Rendus de la Soc. de Biologie, 1862, p. 105.

It would be impossible to give an adequate account of a work of this kind, containing as it does a vast number of detailed cases, without an amount of quotation which would far exceed our limits. It is unquestionably the standard treatise on the subject, and one which should be in the hands of every pathologist.

Caso Pratico Luminosissimo, comprovante l'utilità del Salasso durante lo Stadio del Freddo nel Fugare ed Impedire la Recidività delle Febbri Accessionali Legittime, Restie al Solfato di China e Succedanei. Del Dottor GIAMBATTISTA MADRUZZA, Medico Comprimario Condotto Giubilato in Fano all' Eccellentissimo Dott. GUISEPPE BERETTA, Medico Distinto di Dolo. Estratto dall' Ippocratico, Serie III^a., Vol. XIII^o. Fano. Tipografia di Giovanni Lana. 1868.

A Highly Illustrative Practical Case, proving the Utility of Bleeding during the Cold Stage, in Dispelling and in Preventing Relapse of Regular Periodical Fevers, which have Resisted the Use of Sulphate of Quinia and its Substitutes. By Dr. GIAMBATTISTA MADRUZZA, &c., &c. Extracted from the Ippocratico, 3rd Series, Vol. XIII. 8vo., pp. 8.

MORE than fifteen years after the lamented death of him whom Dr. Balfour, in the number of the *Edinburgh Medical Journal* for the last month (July, 1868), justly terms "*facile princeps* of all our clinical writers," a copy of the above pamphlet reaches Dublin inscribed:—"Al Chiarissimo Graves, Celebre Clinico di Medicina, in ossequio di venerazione, e di profondissima stima." The author will learn with regret that he whom he honours has so long since ceased from his earthly labours.

The attention of Dr. Madruzza had been called in 1839 to the practice advocated by the late Dr. Mackintosh, or, as he throughout misspels the name, "Mackinstok," of Edinburgh, of bleeding in the cold stage of ague; nevertheless he hesitated to put it in practice until the month of July, 1844, when, meeting with a case which proved more than ordinarily obstinate, and in which the usual treatment with quinia, &c., had signally failed, he determined to try it, although the emaciation of the patient would seem to contra-indicate it. The several viscera were, it is stated, sound and healthy. On the 5th of July, the 52nd day of his illness, the

patient, Martelli Francesco, aged fifteen, a porter in the fish market, was bled to ten ounces, with the most marked success, in the height of the cold stage, which was most intense, notwithstanding the excessive heat of the season, and of four heavy blankets. "Vascular reaction quickly succeeded to the cold stage; the diaphoresis was profuse upon the decline of the fever, and was protracted beyond decided apyrexia, which was not again disturbed; and from day to day the organic repair, assisted by special and graduated diet, removed the marasmus; and about the middle of August Martelli was dismissed from hospital, in perfect health, which still continues; nor was he again attacked with intermittent fever."

The author considers his case to be a true triumph for Mackintosh's doctrine, and that it ought to encourage practitioners to adopt a treatment sanctioned by the most celebrated clinical teachers, and among these by Professor Graves, from whose *Clinical Medicine* he quotes the following words:—

"Subsequently the practice of bleeding in the cold stage [of ague], as introduced by Dr. Mackintosh, was tried on an extensive scale in the Meath Hospital, and it is a practice which I can strongly recommend in those cases where there is recurring inflammation of some internal organ." [a]

The experiments here referred to were made by Dr. Stokes, and are detailed by him in the *Edinburgh Medical and Surgical Journal*, Vol. xxxi., January 1, 1829, page 1. The effects of venesection during the rigor there described are:—"Checking the rigor altogether; momentary suspension of the rigor; checking the rigor after a certain quantity of blood was drawn; its return in a mild degree; diminution of its intensity, but not of its length; relief of the local symptoms alone; prolongation of the rigor without diminution of intensity; no apparent effect; disappearance of the rigor on the fourth pyrexial day after the operation, but persistence of the symptoms indicative of internal congestion."

Dr. Stokes gives abstracts of twenty-two cases in which bleeding in the cold stage of ague was resorted to, and of which accurate records were kept. We agree with him that an examination of these cases is calculated to leave an impression against the indiscriminate or even frequent use of the operation at such a time.

[a] Neligan's Edition. Dublin: Fannin & Co. 1864. P. 274.

Many of the patients had an extremely slow and dangerous convalescence; in several instances the disease appeared to be exasperated by the practice; local inflammatory affections occurred several times after the operation; and, lastly, the bleeding appears to have a tendency to convert intermittent into continued fever. Dr. Stokes concludes that "these facts should make us very careful how we interfere with nature by means of the lancet, in simple intermittent, when we have so certain, and, as far as I have seen, so infallible a remedy as the sulphate of quinine." Probably, therefore, the practice, if adopted at all, should be restricted to those cases specified by Dr. Graves, "where there is recurring inflammation of some internal organ." Possibly it may be more useful in the malignant forms of ague common in hot climates than in the milder varieties of the disease witnessed in these countries.

1.—*Epidemic Meningitis, or Cerebro-Spinal Meningitis.* By Alfred Stillé, M.D., Physician to the Philadelphia Hospital, &c. 8vo., pp. 178. Lindsay and Blakiston. 1867.

2.—*Publications of the Massachusets Medical Society*, Vol. ii. No. I.—*Spotted Fever, or Cerebro-Spinal Meningitis.* 8vo, pp. 178. Boston: Clapp and Son. 1866.

3.—*Klinische Beobachtungen über Meningitis Cerebro-Spinalis Epidemica.* Von Prof. Ziemssen and Friedrich Hess, in Erlangen. Deutsche Archiv für Klinische Medicin. 1866. Bd. 1; pp. 72, 346.

4.—*Clinical Observations on Epidemic Cerebro-Spinal Meningitis.* By Professors Ziemssen and Hess. Archives of Clinical Medicine, 1866. Vol. i.; pp. 72, 346.

The brief but lucid essay of Dr. Stillé has earned for the work, the title of which heads our notice, a place which, we venture to predict, will be an enduring and an ever-honourable one in the literature of epidemic meningitis.

History of Epidemic Cerebro-Spinal Meningitis.—A very succinct sketch of the history of the disease occupies the first four pages. The outbreaks have been marked by simultaneity in Europe and America, and by their covering periods of years. The first is

that which is recorded by many observers as spreading over the eleven years from 1805 to 1816, the second extended from 1837 to 1850, while the third dates from 1856, and embraces the current year.

So early as 1802 Bascombe, in his "History of Epidemic Pestilences," speaks of an epidemic at Rettingen, in Franconia, attacking the young and strong, marked by lacerating pains in the nape of the neck, fainting, anguish of the heart, rigidity of the limbs, and death often within twenty-four hours. It is not improbable that even at still remoter epochs epidemic meningitis prevailed, but that its diagnosis from other diseases, characterized by nervous symptoms and cutaneous eruptions, had not been sufficiently established, while the difficulties that stood in the way of *post mortem* examination made the recognition of the pathological conditions of cerebro-spinal meningitis all but impossible.

Between 1805 and 1815 the disease prevailed in one form or another, and with more or less fatality in Prussia, Holland, the Rhine borders of Germany, Bavaria, the east of France, but not elsewhere in Europe. In the United States it began its ravages in 1806, at Medfield, Massachusets, and subsequently appeared in New England, Canada, the State of New York, Pennsylvania, and other States to the south and west (not specified by Stillé). In 1822 it made its appearance at Vesoul, in France; in 1828, at Middletown, Connecticut; in 1828, in Trumbull County, Ohio; in 1830, at Sunderland, in England; and in 1833, at Naples. No record of its occurrence marks the four following years, but in 1837 the disease assumed a new and widely-ranging activity. For two years it was almost exclusively confined to France; in the third and fourth years it spread to parts of Italy, to Gibraltar, and to Algeria; and a year or two later it visited parts of the north of England, and Dublin, reaching Denmark in 1845 to 1848. "While the epidemic was thus spreading through Europe," says Stillé, "it again appeared in the United States at places as remote as possible from transatlantic communication, and hundreds of miles distant from one another."

From 1850 to 1854 epidemic meningitis is not recorded in Europe or America, when, in the latter year, it broke out with extraordinary violence in Sweden, which had escaped the disease at all former periods, and it remained endemic in that country for the six subsequent years. During the same period local outbreaks of limited extent took place in London, Dublin, and Stafford; in

North Carolina, where it appeared for the first time in March, 1856; and in the central portions of New York and Massachusets early in 1857.

The epidemic, of which we are still witnessing occasional examples, appears to have commenced with the outbreak in Holland in 1860-61; in the following year it spread over a large part of Portugal; in the summer of 1863 Germany, almost exempt since the outbreak of 1806, became the seat of a visitation which, commencing somewhat mildly, eventually devastated almost every part of northern Germany; and in the year 1865 the disease made its appearance in Dublin. As a counterpart to the European epidemic of the period under consideration numerous localities in the United States were visited by the disease. It appeared at Livingston County, Missouri, in the winter of 1861-2, and at Indiana, Kentucky, and Connecticut. From 1860 to 1864 it prevailed at Ohio, and in the last year at Illinois. In 1863 it showed itself at Newport, Rhode Island, and in Vermont in 1864. In 1863 it commenced in Philadelphia, and since then has prevailed in that city, and in Maryland, Virginia, North Carolina, Alabama, and other Southern States.

Question of Contagion.—Stillé remarks, with great truth, on the absence of any common conditions in these varied and widespread visitations, noting their frequent outbursts in mid-winter, and insists on the true *pandemic* nature of the disease.

It is well observed in the Massachusets Report, that "The evidence from all sources has been very generally in favour of the *non-contagiousness* of the disease." All attempts to account for its wide-spreading activity, on the theory of contagion, will be found, in our opinion, to be utterly untenable. The instances in which the disease, in its most terrible form, has occurred in isolated cases, without propagation to those in contact with the sick, are out of all proportion to those in which any two cases occurred under the same roof, with any, even probable, ground of belief that one was the immediate cause of the other.

Etiology and Origin of the Disease.—Of this it may be as briefly as positively affirmed, that absolutely nothing is known, or even determined, as probable. Epidemic meningitis occurs in all seasons, in all climates, in all races, including the *black* race in the United States, in both sexes, at all ages, in towns and country districts, under all conceivable circumstances of good and bad ventilation, sewage, food supply, and state and habit of life.

Nature and Pathology of the Disease.—In attempting to give a general idea of epidemic meningitis, Stillé well observes on the protean characters its various forms present, which in a large measure account for the conflicting views expressed with regard to its pathology by different writers. One writer dwells on its "nervous, inflammatory, and comatose" phenomena; another describes them as "neuralgia, delirium, convulsions, paralytic, and comatose;" a third speaks of "abortive, malignant, intermittent, and typhoid" forms. Our author regards the entire series of phenomena thus variously designated as traceable to "lesions essentially the same in all, although varying in degree as much as congestion does from exudation, and in extent from what is invisible to the naked eye to a profuse accumulation of inflammatory products." Of this absolute unity of the diseased states, now generally recognized under the head of cerebro-spinal meningitis, we are ourselves by no means satisfied. Indeed, Stillé, in no doubtful words, marks his own sense of the frequently dual character of the chief phenomena, when he says, page 10:—

"Such opportunities were peculiarly fitted . . . . . to illustrate the surprising variety of morbid phenomena, which the former (epidemic meningitis) exhibits by virtue of its double character as a blood-disease, and an inflammation of the cerebro-spinal membrane."

In a very able section devoted to the consideration of the symptoms of the disease, Stillé passes in review all the chief clinical phenomena presented in the most varied cases.

Taking the whole of the cases well recorded in Europe and America, he concludes that the number of those in which petechiæ were found formed but a small proportion, probably not one-tenth of the whole; but the Massachusets Report gives a higher proportion, it being stated, at p. 99, that of 249 cases competent to be reckoned upon, 129, or somewhat less than 59 per cent., exhibited petechiæ, or "analogous spots." This last vague definition, in our mind, not a little invalidates the observation.

As to the pathological interpretation of those cases which presented well-marked nervous symptoms during life, with absence of spots, and which recovered, no serious difference of opinion probably ever existed. And of the nature of those cases with nervous phenomena during life, and in which *post mortem* examination revealed the presence of lymph or pus on the membranes of the cord and brain, or even well-evidenced congestion, no doubt can

be entertained. But there remains two sets of cases the complete pathological interpretation of which, we hold, has not yet been conclusively defined. We allude to:—

A.—Cases in which symptoms referrible to the nervous system have been present during life, with more or less well-marked petechial eruption, or purpuric discoloration of the skin over more or less extended portions of the surface, and in which, on *post mortem* examination, lymph or pus, or other evidence of inflammatory action in the membranes of the brain or cord, has been detected.

B.—Cases in which petechiæ, or purpuric discoloration, have been present during life, but in which there have been found to be no traces of inflammatory action in the spinal membranes on most careful *post mortem* examination.

In some of these latter cases the brain and cord, and their membranes, have been found absolutely and undeniably healthy.

In another class of cases the membranes of the brain and cord, with other internal surfaces, have shown purpuric discoloration, or absolute hemorrhagic effusion to a more or less considerable extent, phenomena, which it is needless to say, are in no way attributable to inflammatory lesion, and which are common to such diseases as purpura hemorrhagica and yellow fever, and to states of the body the result of certain forms of vegetable or animal poisoning, death by lightning, and some other not well-defined conditions, in which there is no question of inflammatory action.

Of these varieties of disease well-marked examples have been published by various writers.

A very remarkable and important series of five specimens of the spinal cord were presented in the last session of the Pathological Society of Dublin by Dr. Lyons. In two instances nervous phenomena in non-petechial cases during life were found to be associated, *post mortem*, with well-marked arachnitis of the brain and cord proceeding to lymphy exudation. In three instances petechiæ and purpuric patches were present during life in cases in which there was found, *post mortem*, no evidence whatever of the slightest inflammatory lesion in brain or cord. Drs. Benson and Hewitt, and other observers, also of this city, have given proof of the non-existence of any sign whatever of inflammatory lesion in cases which, during life, exhibited petechiæ and purpura.

Dr. Mapother has published particulars of a well-marked case of purpuric spotting during life, with copious hemorrhagic effusion on the membranes of the brain, found *post mortem*.

The Massachusets Report furnishes another, and, in our mind, very conclusive case at page 45.

What position in the nosological scale those cases are destined finally to occupy may be yet doubtful; but we affirm that they are *not* of affinity with cerebro-spinal meningitis.

The observations of Ziemssen and Hess will be found well worth attention, but our limits prevent us from examining them at present. They are illustrated by numerous pulse-tracings.

Association for Promoting the Extension of the Contagious Diseases Act, 1866, to the Civil Population of the United Kingdom.

The above Association, which has been in active operation for some time, has issued a Report on "the extent of Venereal Disease, the operation of the Contagious Diseases Act, and the means of checking Contagion." And, before entering on the consideration of the important and valuable information presented in its pages, it may be well to refer briefly to the "objects" of the Association, and the great social benefits to be anticipated from its labours.

The "objects" of the Association appear to be two-fold—firstly, the isolation of those labouring under syphilitic diseases, whereby the propagation of the contagion may be prevented; and, secondly, yet first in importance, the moral and social improvement of the unfortunate women, whose condition so urgently calls for our most earnest sympathy and consideration. The Association is entirely opposed to the Continental system, by which prostitution would seem to be licensed; on the contrary, its chief end and aim is to discourage that fearful vice, by which so many unhappy females are brought to degradation and an untimely grave.

Such are the objects of the Association, clearly and unequivocally laid down, not only in their report, but also in all previous documents issued under their authority. And yet difficulties are raised and suggestions started as to its operations having an immoral tendency, and being calculated to engender a further incentive to vice. We are told, in fact, that the present movement will eventuate in the encouragement of prostitution! It has been boldly asserted that syphilis has been instituted, as it were, as a punishment for vice, and as a deterrent for the libertine, and that, as we value virtue, we cannot discard its aid! All this, and more,

has been put forward in opposition to the Association, but we venture to hope that results, which after all must stand as the best tests, will eventually disprove such views; and we moreover feel confident that if it should in time appear that, under the preventive system, not only prostitution and disease have diminished, but that the moral condition of the unfortunate females has been raised, the very originators of these mistaken views will be the first to congratulate the Association on the incalculable benefits they have achieved for humanity. Already have these gratifying results begun to appear under the operation of the Act now in force at some of our naval and military stations; and, previous to entering on any detail, we shall endeavour to explain very briefly the nature of the Act as it now exists, and the important sanitary and social improvements that have been secured by its provisions.

In the year 1866 the Act was passed by the Legislature, having for its object the prevention of contagious (venereal) diseases at certain of our naval and military stations in the United Kingdom. The absolute and pressing necessity for this measure became at once apparent on reviewing the deplorable consequences that resulted to two most important branches of the public service, from the dissemination and spread of the venereal poison. The civil practitioner can have no adequate conception of either the extent or effects of this great and destructive evil. It preyed upon the efficiency of our army, and its baneful influence equally interfered with the sanitary condition of our navy. The large number of men rendered temporarily unfit for duty in both services, and the numerous cases invalided from year to year from the effects of the contagion, presented an accumulated record of such magnitude as will enable us to estimate the vast expense that must have been entailed on the country by the disease spreading without check or control in our naval and military stations. Our readers will doubtless be surprised on learning that, according to the evidence of Admiral Sir W. Fanshawe Martin, K.C.B., no less than half of the invaliding in the navy was due to venereal; the multiplied facts deducible from the effects of the contagion in our army, strengthened the conviction as to the necessity for some preventive measures to control and counteract the spread of an evil so destructive to the efficiency of both branches of the service. And we have no doubt that now, as the Act is available, every possible advantage

will be taken of it by the able and efficient administrators at the Admiralty and War Office.

Under the Act 1866, it is provided that any woman in any place to which its provisions apply, found to be affected with contagious (venereal) disease, shall be liable to be detained in a certified hospital, until discharged therefrom on a certificate under the hand of the principal medical officer: and in the framing of the Act it will be seen that every caution has been displayed to avoid any possible abuse of its powers. No woman can be required to submit to medical examination until "information on oath is laid before a justice of the peace by a superintendent of police," to the effect that the informant "has good cause to believe that the woman is a common prostitute, and either is resident within the limits of any place to which the Act applies, or being resident within five miles of those limits, has, within fourteen days before the laying of the information, been within those limits for the purpose of prostitution." In such case "the justice may, if he thinks fit, issue a notice thereof addressed to such woman, which notice the superintendent of police shall cause to be served on her;" and "if the woman on whom such notice is served appears herself, or by some person on her behalf, at the time and place appointed in the notice, or at some other time and place appointed by adjournment," the justice present, "on oath being made before him, substantiating the matter of the information to his satisfaction, may, if he thinks fit," order the woman to be subjected to a periodical medical examination by the visiting surgeon, for any period not exceeding one year, for the purpose of ascertaining if she be affected with a contagious disease. The times and places for these examinations are regulated by the Admiralty or Secretary of State for War, and they are specified in the orders issued by the justices, copies of which orders are served on the woman by the superintendent of police. If the woman does not appear, and it is "shown (on oath) to the justice present that the notice was served on her a reasonable time before the time appointed for her appearance, or that reasonable notice of such adjournment was given to her"—in such case the justice proceeds on the matter of the information, being substantiated on oath, and, if he thinks fit, issues the order.

Under the Act, powers are given to the Admiralty or Secretary of State for War to provide certified hospitals in which the women found to be affected with a contagious disease are liable to be

detained on a certificate to that effect signed by the visiting surgeon. The certificate is to be in duplicate—one to be delivered to the woman, and the others to the superintendent of police. If the woman, after the certificate is delivered to her, refuses to go to the certified hospital named in the certificate, "the superintendent of police, or a constable acting under his orders, shall apprehend her," and convey her to the hospital for treatment on the authority of the above certificate of the medical officer. The detention in hospital is regulated by the visiting surgeon, on whose written certificate she is discharged.

The reception of a woman in a certified hospital involves an undertaking to provide for her care and treatment, lodging, clothing, and food during her detention in hospital, and while being conveyed or transferred to a certified hospital, she is deemed legally in the custody of the person conveying, transferring, or detaining her. But in order to make further provision against any abuse of the Act, clauses are introduced to limit the detention to three months in hospital under the same or any one certificate, and enabling the woman to apply to the justice for discharge if she considers herself entitled to it. This she obtains if the justice is satisfied on reasonable evidence that she is free from disease. Special clauses are introduced, setting forth various penalties instituted to secure the due fulfilment of the provisions of the Act. Nothing unreasonable or partaking of unnecessary severity will be found here; nothing that is not absolutely called for to carry out objects of such great importance to the public welfare.

With regard to the medical examination, it is satisfactory to know that this part of the Act, so far from meeting with any opposition from the women, has, according to the interesting report of Mr. Berkeley Hill, been accepted by them at Chatham and other stations, and conformed to as long as the examinations are conducted regularly, and not by singling out particular females, whereby they become objects of reproach to their companions. Indeed many of them voluntarily submit themselves for medical examination; for this, it may be observed, a special provision is introduced into the Act. This information affords a valuable hint to the medical officers, as to the necessity for conducting this part of their duty with the most scrupulous regard for the feelings of those poor misguided creatures, whom it ought to be our object, not only to relieve from their bodily ailments, but also to impress on, and

teach while under our treatment, that there is a public interest in operation for their good, and the permanent improvement of their moral and social condition. This will tend to convince them that they are no longer miserable outcasts, but that they constitute a class which has gained the sympathy of a large and influential section of the community.

The Act, as it is at present framed, applies to Portsmouth, Plymouth, Devonport, Woolwich, Chatham, Sheerness, Aldershot, Windsor, Colchester, Shorncliffe, the Curragh, Cork, and Queenstown. And the beneficial results that have accrued from its operations have been most encouraging. At Chatham, we learn, on the authority of Mr. Berkeley Hill, that "the hospital was considered a very good thing by all the women, one of whom declared she would always come back to Chatham if she ever became ill elsewhere." This is of importance as evidence of the efficiency of that institution, which we learn from the report has forty beds, and, in case these should be all occupied, additional accommodation is provided in London, where there are eighty beds for patients from Chatham, Woolwich, and Sheerness.

The information afforded by Dr. Anderson, Deputy Inspector-General of Melville Hospital, is most valuable as to the beneficial effects derived from the Act, both in alleviating the severity of the disease, and in diminishing the number of men attacked by it amongst the marines at Chatham. His statistics appear in the 35th page of the report, prepared by Mr. Berkeley Hill, and afford very satisfactory results. In the same page Mr. Hill gives us some highly gratifying information as to the operation of the Act in improving the social and moral condition of the women. At Chatham, Rochester, and Stroud, "the moral condition and feeling of the women," he tells us, "are greatly raised." The police, we learn from the same source, have become their protectors by rescuing them from the tyranny and brutality of the low beer shop keepers. But, whilst we dwell on these gratifying and encouraging facts, we must not conceal from ourselves that we are but in the beginning of our labours. The facts put forward so admirably by Mr. Hill, not only teach us what has been done, but emphatically point out to us what may yet be effected by judicious and persevering efforts. The mere perusal of the interesting report before us, which we have but lightly touched on, must satisfy us that there is a state of misery and appalling degradation wide-

spread and deep amongst our female population arising from prostitution and disease, which no private enterprise nor philanthropy can remedy. To the Legislature then we turn for the means of counteracting this great social evil which is undermining both the mental and physical condition of the people.

It is a remarkable fact that, notwithstanding the agitation which has of late taken place regarding the destructive influence of the venereal disease, and the deplorable consequences resulting therefrom to our civil population, an impression is abroad that the poison has been deprived of much of its original virulence, and that it is by no means so widespread nor frequent as it was in former periods. No error can be greater nor more deceptive than this; and it is of the first importance that it should be corrected, because it is peculiarly calculated to deceive the public mind, and thereby render it indifferent to the urgent necessity that exists for the preventive measures now so urgently required for the health and well-being of the community. In estimating, or rather describing, the subtle and poisonous influence of the contagion, we cannot do better than quote the following remarkable and impressive passages from the well-known work of Parent-Duchatelet, "De la Prostitution dans la Ville de Paris":—

"De toutes les maladies qui peuvent affecter l'espèce humaine par voie de contagion, et qui portent à la société les plus grands préjudices, il n'en est pas de plus grave, de plus dangereuse et de plus à redouter que la syphilis. Sous ce rapport, je ne crains pas d'être démenti, en disant que les désastres qu'elle procure l'emportent sur les ravages qu'ont exercés toutes les pestes qui, de temps en temps, sont venues porter la terreur dans la société.

La syphilis est chez nous, elle est chez nos voisins, elle est dans l'univers; elle ne tue pas immédiatement, il est vrai, comme beaucoup d'autres maladies, mais cela n'empêche pas que le nombre de ses victimes ne soit immense. Ses ravages n'ont pas d'interruption; elle frappe de préférence cette partie de la population qui, par son âge, fait la force aussi bien que la richesse des états. La syphilis vient énerver cette population au moment même de son existence, où, par les lois de la nature, elle se trouve en état de procréer des êtres vigoureux; et si elle ne rend pas cette population stérile, les malheureux qui en proviennent forment une race abâtardie, aussi impropre aux fonctions civiles qu'au service militaire, et qui, en

définitive est un fardeau pour la société. Enfin, l'innocence et la vertu la plus pure ne sont pas, dans nos sociétés modernes, à l'abri de ses atteintes: que de nourrices mercenaires, que d'épouses vertueses, que d'enfans à la mamelle n'en sont pas tous les ans, cruellement attaqués!"

It has pleased an all-wise Providence, in his solemn and mysterious dispensation, to afflict the human race with divers diseases and bodily ailments; some of these are accompanied by unspeakable sufferings, and either with rapid strides or by slow degrees, but not less certain results, terminate in that death which may be looked on as a merciful release from bodily anguish. But of all the varied and complicated forms of disease that have come under our notice, we believe that not one—even one—of the fearful catalogue could present such awful features or consequences as the graphic description Parent-Duchatelet has presented to us of syphilis in the above passages. Every sentence therein is full of truth, and bears on it a lesson which no statesman nor philanthropist can be indifferent to. And doubtless it is such knowledge that has now awakened public attention and created the present movement in favour of some enactment which may save the present generation, and their children's children, from the terrible consequences described in the lines we have just quoted.

But, fearful as is the picture drawn by Parent-Duchatelet, he has not given all. He has omitted to notice that wretched and pitiable condition into which the miserable victim to the disease, in some instances, passes, after the subtle and insidious effects of the poison have involved all the tissues of the system, reducing the whole to an incurable wreck, the intellect becomes enfeebled and the mind weak, and all those nobler and higher qualities which stamped our nature in its primitive integrity seem to be impaired. Unquestionably we have seen a few, happily but a few such results. A very melancholy instance is at present under our notice. It is the case of a gentleman whom we knew in very early life. As an example of a man we have seen but few that surpassed him in noble form or physical condition; quick in intellect and possessed of remarkable conversational powers. He had been afflicted with the phagedenic form of the disease, which we believe to be incurable if neglected in the earlier stages.[a] Such was this gentleman's case

[a] Observations on Venereal Diseases. By Hamilton Labatt, p. 165.

when we saw him in consultation with the late Mr. Carmichael. We shall not attempt to detail his many long and tedious years of suffering; but he is now a wretched remnant of himself—stooped, distorted and disfigured, hideous to look on, and all his conversation and remarks characteristic of approaching imbecility. It is but an act of justice to the distinguished surgeon who saw this case with us, as well as to ourselves, to record in these pages that nothing could exceed the reckless indifference this unfortunate gentleman displayed in the earlier stages, both to the proper care of himself, as well as to the observance of the directions he received from his surgical attendants.

We may mention that, previous to the year 1866 (the year of the existing Act), certain preventive measures, in respect to the registration and inspection of prostitutes, authorized by the previous Contagious Diseases Prevention Act, 1864, were put into operation abroad, with the best results; and we have in the admirable report before us a very interesting letter, dated from Malta, addressed by Lieutenant-General Sir Henry Storks, K.C.B., to Mr. Skey, as Chairman of the Committee in London, in which it is stated that, under the above system, "the disease may be said to have almost disappeared in the Islands of Corfu, Zante, and Cephalonia." And, again, in the same communication, General Storks observes, "In Malta the same police regulations exist, and I know of no place so singularly free from venereal disease as regards the professional prostitutes." The letter closes with the following impressive passage:—"The amount of disease and misery that would be prevented by enforcing a sanitary inspection of prostitutes is incalculable, and it is a subject which earnestly claims the attention of the authorities competent to deal with it."

It would be needless to pursue farther the very convincing evidence which can be produced in favour of the great advantages that would result from an extension of the Act of 1866. We know that difficulties must be encountered at first in introducing it amongst our civil population; but we are confident that, under an administration duly tempered with a careful consideration for the feelings and prejudices of the people—all these would speedily subside. Only teach them that you are working for their individual good and they will be seen to unite and co-operate with you.

That the Association, as now organized, is fully equal to the importance of its mission, there can be little doubt. A few months

have scarcely elapsed since the first meeting was held in London. At that early period we augured most favourably as to the ultimate prospect of success, seeing the influential, though small number of individuals who had attached themselves to the movement. We then had Fergusson, Jenner, Anderson, Watson, Paget, Burrowes, and other eminent men of our own profession, as Vice-Presidents, and with them were associated other distinguished men who, though not connected with the medical profession, heartily co-operated in the labours of the Association. Subsequently, and through the untiring energy and perseverance of the able honorary secretaries for London, Mr. Berkeley Hill and Mr. Curgenvan, the numbers greatly increased, and the long list attached to the report, just published, presents a display of intellect and influence which cannot fail to have weight with the Legislature. But the Association is not confined to London. In Edinburgh and Dublin vice-presidents, committees, and honorary secretaries have been appointed, and the same has been effected in upwards forty other leading cities and towns throughout the United Kingdom. It would be invidious as well as unnecessary to select from the long list in the report any particular names—all, in our estimation, deserve equal prominence from their devotion to this noble cause. Indeed we should not have put forward the names we have already mentioned, but that we feel and believe there is a peculiar distinction due to those who have laboured in this great cause from the beginning, and who, by their high position and eminence, have attracted the support and co-operation of the many distinguished men who subsequently joined the Association.

It is a matter of congratulation that, during the present Session of Parliament, this important movement has engaged the serious attention of the Legislature. Questions connected with it have been put in the House of Commons to the Government; and very recently Lord Lifford (one of the vice-presidents, whose zeal in this good cause is beyond all praise,) has obtained a select committee of the House of Lords to inquire into the subject. That committee, which includes amongst its members some of our most influential Peers, has been sitting on the question, and we learn will soon issue their report. Much will depend on the substance of that document, but from the knowledge we have of the energy, perseverance, and business-like habits of the noble chairman (Lord Lifford) we entertain confidence as to the result, provided he

receive that support which he has a right to expect, and which it is our obvious interest to extend to him.

Contemporaneous with this legislative inquiry a very influential meeting has been recently held in London under the chairmanship of Sir Thomas Watson, Bart. The long list of noblemen and gentlemen, including Members of the Houses of Lords and Commons, who attended that meeting, fully attests the very great interest felt on the subject.

Although we have considered it inexpedient as well as unnecessary to enter into the particulars of the organization of the Association in the various localities, it would be a great omission to pass without some notice what has been done in this couutry in furtherance of the movement. In Dublin Mr. Porter, President of the College of Surgeons, with Professors Hargrave, Banks, Mapother, and Colonel Adamson, have been appointed Vice-Presidents of the Association, and a very able and efficient committee, composed of the following gentlemen, all well known and distinguished for their professional acquirements, has been formed: — Professor Geoghegan, Drs. Wilmot, Byrne, Head, Irvine, Lentaigne, and Robert MacDonnell, with our respected Magistrate and Town Councillor, Mr. Henry Maclean, who has ever evinced a sincere interest in everything calculated to advance the public good. At a very early period of the movement Mr. Hamilton Labatt, author of the work on Venereal, and several other publications on Syphilitic Venereal Diseases, was requested and consented to act as Honorary Secretary for Dublin. Under this organization a meeting was held at the private residence of the Honorary Secretary in Upper Fitzwilliam-street during the past winter, and some important resolutions passed, which were transmitted to London. In Cork and Belfast the movement has been adopted and officers appointed; Dr. Armstrong has been nominated honorary secretary in the former town, and Dr. Mac Cormac in the latter. And we have much satisfaction in stating that the office of vice-president in Belfast has been accepted by the Lord Bishop of Down and Connor.

We shall now close our remarks on this all-important subject, but not without a fervent and sincere hope that success may ultimately crown the efforts of the Association. We know of nothing more noble, nothing more exalted than the objects they have in view; and so, in proportion will, of a certainty, be to them the deep and lasting gratitude of mankind.

PART III.

MEDICAL MISCELLANY.

Reports, Retrospects, and Scientific Intelligence.

A REPORT

UPON

EPIDEMIC CEREBRO-SPINAL MENINGITIS, OR CEREBRO-SPINAL FEVER.

By Edward W. Collins, M.B., T.C.D.;

Demonstrator of Anatomy in the Medical School of Trinity College.

Shortly before the middle of the present century the medical profession in this country became aware of the existence of a disease of an epidemic nature, which, as far as we can learn, was previously unknown, save to those among them who had access to the medical literature of the contitents of Europe and America—a matter of greater difficulty then than now. This disease, to which the name of "cerebro-spinal arachnitis" was at that time given by one[a] who, though now no more, has left us so faithful a record of it, has since, at times, in milder form, appeared among us. Twenty years, however, passed away before it again assumed its former epidemic character. At the end of this period, in the spring and later months of 1866, an appalling type of the disease manifested itself in Dublin and several of the provinces. During the subsequent epidemic of cholera it remained in abeyance; but, on the subsidence of the former early in 1867, soon showed itself with renewed vigour, nor have cases since been wanting to remind us of its presence even still. This epidemic, immediately preceded as it was by a remarkable outbreak of the same malady in Germany and several of the United States of North America, has acquired for the disease a position in the medical literature of these countries, which, till then, it had been denied.

[a] Mayne, R. Dublin Quart. Jour., Aug., 1846, p. 95.

In proof of this fact, we need only point to the vast addition which, within the last few years, has been, and is being, made to our knowledge of the disease. Germany, America, England, and lastly Ireland, have each been foremost as the occasion and the time demanded; and the latest systematic works on the Principles and Practice of Medicine[a] in the New World and the Old, have now devoted to the disease that space and consideration previously wanting, which its formidable nature, its singular phenomena, its numerous and recent epidemics in places widely separated, and increased experience with the recent accessions to our knowledge thereby acquired, rendered necessary.

At such a time as this it may be interesting to consider the progress of the disease in those countries where, previous to the more recent experience in our own isle, it had been long known and studied.

The history of many, if not all, diseases in ancient times, to a great extent, is shrouded in obscurity, from the imperfection and inaccuracy of medical knowledge and medical writings; nor is the history of even such remarkable diseases as epidemics handed down with such accuracy that at the present day we can clearly distinguish their nature. Hence it is that we feel ourselves quite unable to trace the history of this peculiar disease further back than the commencement of the present century. An attempt, indeed, was made by Gallup,[b] in 1815, to connect it with the epidemics of the petechial and spotted fevers, which prevailed at various dates before 1800 throughout the continent of Europe. We do not know, however, to what diseases these names apply. We do not know whether, what one writer may have called petechial, another may not have called spotted fever, nor whether one or both names were applied to typhus fever, or to the disease under consideration. The fact is, that we have no certain evidence on which to rely regarding the occurrence of the disease previous to the commencement of the present century, though it is naturally to be presumed that such occurrences took place. Stillé,[c] the latest American writer upon the subject, alludes to a local epidemic which occurred at the small town of Rœttingen, in Franconia, in 1802, in a manner which seems to imply the existence in his mind of some connexion between this epidemic and cerebro-spinal meningitis. He is opposed in this view, however, by an authority no less eminent than the Historian of the "Epidemics of the Middle Ages," who regards the Rœttingen epidemic as one of the so-called "sweating sickness." Moreover, the accounts left us are so meagre that we would be slow in pronouncing definitely upon it. On

[a] Geo. B. Wood. Philadelphia: 6th ed., 1867. Vol. i., art. "Petechial Fever." J. R. Reynolds. London: 1868. Vol. 2; art., "Epidemic Cerebro-Spinal Meningitis."

[b] Gallup, J. A., Sketches of Epidemic Diseases in the State of Vermont.

[c] Stillé, A., Epidemic Meningitis. Philadelphia: 1867.

the other hand, we cannot agree with Radcliffe,[a] in referring our first actual knowledge of the disease to so late a period as 1837, when it manifested itself so markedly in the South of France. Were we to do so, we should overlook the plain evidence to the contrary of many European and American physicians.

It is in 1805 that, for the first time, we have undoubted evidence of the occurrence of an epidemic of cerebro-spinal meningitis. In that year, from February till April, it prevailed in the city of Geneva and its environs, and was closely observed by Vieusseux and Mathey,[b] who, in the same year, published an account of their experience, declaring that neither they nor their colleagues had ever seen a similar disease. A petechial eruption was a prominent sign, and it is described as a malignant non-contagious fever. An autopsy, in one case, revealed an exudation both upon the upper and under surfaces of the brain, the cerebellum, and medulla oblongata. Of those attacked, the number of which is not mentioned, thirty-three succumbed. This account, in which we find an unmistakable picture of epidemic cerebro-spinal meningitis, possesses a peculiar interest not alone as the first, but as the only available record regarding the prevalence of the malady in Switzerland.

In each of the eleven following years isolated outbreaks of the disease occurred in various portions of Europe,[c]—thus, in the Prussian army, in 1806-7; in Briançon and Ashburton (England), 1807; Dantzic, 1811; Brest, 1813; Grenoble and the garrison of Paris, 1814; Metz, Pont-á-mousson, Sarreguemines, Mainz, Grenoble, and Paris, 1813-16.

During this period it also ravaged the United States of North America, commencing, as far as we can learn, in 1806, at Medfield, in Massachusets; and in the ten succeeding years it extended throughout New England, visiting, besides many States in the South and West, the State of Pennsylvania, New York, and even Canada. There can be no doubt that this epidemic, which prevailed in North America from 1806-16, and which has been so accurately described by Danielson and Mann, Strong,[d] North,[e] Hale,[f] and others, under the name of "spotted fever," was truly a cerebro-spinal meningitis. Nor would any such comment here be necessary were it not that so distinguished a physician as Hirsch[g] states that "this disease" (*i.e.*, spotted fever) "had nothing in common with that under consideration." No more conclusive

[a] Radcliffe, J. Netten., in Reynold's System of Medicine. Vol. ii., p. 676.

[b] Cf. Journ. Génér. de Méd. xi., p. 163, 243.

[c] Boudin, C. M., Traité de Géographie et de Statistiques Médicales. 1857.

[d] Med. and Philosoph. Register. Philadelphia: 1811. I. 12.

[e] A Treatise on a Malignant Epidemic, commonly called Spotted Fever. New York: 1811.

[f] History and Description of an Epidemic Fever, commonly called Spotted Fever. Boston: 1818.

[g] Die Meningitis Cerebro-Spinalis Epidemica. Berlin: 1866, p. 11.

answer can be given to such a statement than a mention of the fact that, beside the record of the autopsies, the writers on this epidemic, as they gained increased experience, almost universally protested against the designation they had previously adopted, owing to the inconstancy of the eruption which they had at first considered so characteristic of the disease.

The only knowledge[a] we now possess of the further progress of the disease before 1837 is that, in 1822, a temporary outbreak took place at Vesoul, in France; in 1823, at Middletown, Connecticut; in 1828, in Trumbull County, Ohio; in 1830, at Sunderland, England; and in 1833, at Naples. In 1837, however, we again meet with it as a wide-spread epidemic, devastating, during a course of thirteen years, France, Italy, Germany, Ireland, England, Denmark, Gibraltar, and some parts of Spain, in Europe; the province of Algeria, in North Africa; and, finally, a great number of the United States, in North America.

The first general epidemic[b] of the disease, which visited France in 1837, as Hirsch has pointed out, appeared almost simultaneously in two portions of the Southern district, and spread thence over a large portion of the country in a northerly direction. One of these was Bayonne, in the south-west, where isolated cases were observed among the garrison during this and the two succeeding years. At the same time, the disease appeared in some of the provinces—in the districts of Dax, Mugron, Tartas, Bourdeaux, La Rochelle, &c., towns and villages situated upon the banks of the Adour—the civilians alone suffering. In the spring of 1838 it visited Rochefort, and was at first exclusively confined to a regiment which had come from one of the provinces. At the end of the year, however, it broke out among the inhabitants, and in the convict prison, attacking both the convicts and the prison anthorities. About this time the regiment quartered here was removed to Versailles, where the disease soon began to show itself amongst the garrison. In 1841 it died out here, but immediately after visited the capital, co-existing during the summer of 1842, with an epidemic of typhoid fever. While prevailing in Versailles it also appeared in three separate portions of the northern provinces, two of these being in the north-west, and one in the north-east. Thus, in 1840, we find the military, and, in the succeeding year, the townsfolk of Laval suffering; in the winter of 1840–41, the troops stationed in Le Mans and Chateau Gonthier, who had come thither from Laval, as well as the military and civil population of many of the surrounding districts, for example, Poictiers, Rambouillet, Blois, Joigny, and Tours; and, in 1842, the inhabitants and garrisons of Ancennes and Nantes. In the second portion of the north-western district, lying farther north, it appeared

[a] Cf. Stillé, p. 14.
[b] Cf. Boudin and Hirsch.

among the military at Brest, L'Orient, Caen, and Cherbourg. In the north-east, the garrison of Metz suffered in 1839, and that of Strassbourg in the autumn, winter, and spring of the following years (1840–41); nor did the inhabitants of the latter town escape the ravages of the disease. In many of the neighbouring districts also—for example, Schelttstadt, Hagenau, Buxweiler, Wasselone, Nancy, Colmar—it occurred amongst the troops, having been brought among them, it is stated, by the detachments which arrived from Strassbourg. This epidemic at Strassbourg is worthy of especial notice; indeed it marks an era in the history of cerebro-spinal meningitis, associated as it is with the labours of Tourdes,[a] whose writings then, for the first time, gave that impetus to the study of the disease which has since been so fruitful in its results. The second portion of southern France, from which the disease seemed to extend itself in 1837, lay on the east, in the provinces of Foix and Narbonne. In the ensuing spring it broke out with great violence among those dwelling in the plains of Hers, in the neighbourhood of Toulouse, and four years later among the inhabitants of this town and those of Aigues-Mortes. During this period it also attacked many of the garrisons stationed in the south-eastern districts; for example, those of Toulon, Nismes, Avignon—where it also prevailed in a severe form among the citizens—Perpignan, Montbrison, Pont d'Esprit, Marseilles—among the troops who had come from Algeria—and Lyons.

In 1843 cerebro-spinal meningitis seems to have almost disappeared from France, a few isolated cases alone remaining upon record. This state of things, however, was of short duration, for it again entered upon its dread course in 1846-48, revisiting, for the most part, the same districts where it had previously prevailed, and confining itself all but exclusively to the military, as in the preceding epidemic. We find it appearing among the garrisons stationed at Avignon, Lyons, Metz, Nismes, Toulouse, St. Etienne, Orleans, Bourges, Lille, and Paris; whilst a few cases only occurred among the civilians in Orleans, Corbeil, and Petit Bourg.

It is evident from these facts that the southern and northern portions of France, both on the east and west, pre-eminently suffered; whereas the high central plateaus were almost wholly exempted from the ravages of the disease. Hirsch well points out that in many instances it seems to have followed the course of the large rivers, especially that of the Adour, Rhone, Rhine, and Loire. The wide distribution of the epidemic may be judged from the fact that during the eight years of its career forty-nine outbreaks are recorded as occurring in thirty-seven of the eighty-six departments then comprehended under the name of France.

Soon after the outbreak of cerebro-spinal meningitis in France, in the

[a] Tourdes, G., Histoire de l'Epidémic de la Méningite Cerebro-Spinale, etc. Strassb. 1843.

winter of 1839-40, the disease showed itself in Italy, in the then kingdom of Naples, and in the following year spread throughout the surrounding Papal States. It appears to have first visited the districts of Mignano and Cervaro, in the Terra di Lavoro; next the Terra di Bari, Canosa, Spinazzola, Aquaviva, &c. In the Principato Ulteriore it spread very widely, as also in Rocca, Evandro, Eboli, Santo Margano, Frigento, Controne; in the districts of Basilicata, Melfi, Torcicollo, Pescopagano; in the parish of Martina, situated in the Terra d'Otranto; in the district of Naples; among the galley slaves in Procida; and lastly, in the great epidemic in Calabria Ulteriore, in Belcastro, Mesaruca, Ponte Corvo, Santo Valentino, Santa Agata de Gotis, Maida, &c. In the winter of 1843-44 it appeared in the district of Cotrone, in Calabria, and in the same year visited Sicily, continuing there till late in 1844. In September of that year reports from Palermo state that it had already visited Agliastro, Carini, and Caltanisetta, and that it was then prevailing in Terra Nuova. The last account of cerebro-spinal meningitis in Italy dates from the spring of 1845, when it was noticed afresh in the Terra di Lavoro and in the provinces of Alife and Piedmont.

From 1840 to 1847 it seems to have prevailed almost annually in Northern Africa, in several portions of the province of Algeria,[a] as much amongst the troops of the French garrisons as among the natives. In the beginning of the year 1840 it first appeared in the province of Constantine, in Setif and Bathna, and simultaneously among the garrisons at Douéra and Algiers. In the following year it entered Algiers itself and the neighbouring town of Bilhah, spreading amongst the civilians and garrison; and in the succeeding winter it was very widely diffused over the central and eastern portion of the French possessions in the provinces of Constantine and Algiers. In 1844 it visited the town of Constantine, and in the following winter Phillipsville, Douéra, and other places in both provinces. The last and most important outbreak occurred in the winter of 1846-47. It then appeared in many portions of both provinces—Algiers, Douéra, Medeah, Orleansville, Constantine—and even spread far and wide among the Arab population to the remotest parts of the country, Oran alone escaping.

While the disease was thus ravaging France and Algeria, in 1842, it visited, in the Western Hemisphere, several widely-separated portions of the United States[b]—Louisville, in Kentucky; Rutherford County, in Tenessee; and Montgomery, in Alabama. In 1845 it appeared in Mount Vernon and other places situated in the southern part of Illinois; in the winter of 1846-47 in the State of Arkansas; in 1847 in the States of Missisippi, Tenessee, Missouri, and Louisiana. In the spring of 1848

[a] Bertherand. Med. et Hygiène des Arabes. Paris: 1855.

[b] Cf. Ames, Chester, Hicks, Phillips, White, in New Orleans Med. Journ., 1847 and 1848.

it reappeared at Montgomery, in the State of Alabama, and spread throughout the neighbouring plantations. It broke out at the same time with great violence in the extreme west of Pennsylvania, and in the following year entered the States of Massachusets and New York. Finally, in 1850, it re-visited New Orleans, spreading widely among the black population.

Returning to Europe, we find the disease prevailing in Gibraltar and in Spain in the winter and spring of 1844.[a] This is the only record we have of its occurrence in this country. It is further worthy of remark, that it was, with few exceptions, confined to the civil portion of the population.

In the spring of 1845 the disease appeared in Denmark,[b] in the province of Jutland. The chief seat of the epidemic was Aarhuus in the district of Frysenborg; but cases were also observed in other parts of Jutland, as well as in the Isles of Funen, Laalland, and Zeeland, especially in Copenhagen. In the following years it visited Zeeland and many other places throughout the kingdom, nor did it cease to attract notice till the year 1848.

Cerebro-spinal meningitis visited the British Isles a year later than Denmark. In the winter and spring of 1846, it appeared in the majority of the workhouses of Ireland, especially in those of Dublin, Bray, and Belfast;[c] among the recruits stationed at the Constabulary Barracks, Phœnix Park, in Dublin; and in the spring of the same year in Liverpool,[d] and in Rochester,[e] in England. There is no further record of the disease till the year 1850, during which a remarkably mild epidemic seems to have prevailed in Dublin.[f]

Four years again elapse, during which we lose sight of cerebro-spinal meningitis. At the end of this period, however, in 1854,[g] it suddenly visited the Scandinavian Peninsula,—a portion of Europe which had hitherto wholly escaped its ravages—with an almost greater violence than any of the countries previously attacked. This holds good in an especial degree regarding Sweden, almost the entire of which the disease overran during the following seven years, whilst it only appeared in Norway in 1859, at a time when it was dying out in Sweden.

Hirsch has drawn attention to a peculiar feature connected with the spread of the disease in Sweden. The epidemic, issuing from the southern and south-western portion of the country seems to have advanced annually further in a northerly direction; so that the places

[a] Thompson and Gillkrest, in Lond. Med. Times and Gazette, 1844 and 1845.
[b] Ditzel and Uldall, in Biblioth for Läger. 1846.
[c] Mayne, in Dublin Quart. Jour. 1846. R. W. Smith, Parliamentary Report.
[d] Whittle in Lond. Med. Gaz. 1847, iv., p. 807.
[e] Browne in Trans. of Epidemiological Soc. Vol. ii.
[f] M'Dowel in Lond Jour. of Med. 1851.
[g] Cf. various writers in Hygiea. 1859 and 1863.

previously attacked were, in the following year, almost wholly exempted. the southern boundary of the new sphere of the disease, nearly, or rather exactly, corresponding with the northern limit of the previous year.

In the spring of 1854, isolated cases were met with in Götheborg, and towards the close of the year, in the governments of Bleckinge and Kalmar. It was not, however, till the first half of 1855 that the disease became widely diffused, and assumed the character of an epidemic, spreading northwards throughout the eastern portion of Bleckinge, until it reached the town of Kalmar, upon the shores of the Baltic Sea. Simultaneously small isolated epidemics were observed in portions of the provinces of Jönköping, Christianstad, Bohus, and Södermanland. During the latter half of the year 1855, the disease entirely disappeared from Kalmar; but in the spring of 1866, it reappeared to the north of this town, and spreading throughout the provinces of Jönköping and Oestergöthland, finally reached Philipstad, in Wermland, more than $1\frac{1}{2}°$ north of Kalmar. Bleckinge, Bohus, Götheborg, Elfsborg, Oerebro, and Wermland also suffered. In May it again died away, nor did it return during the remainder of the year. The commencement of the new year, however, was the signal for a fresh outbreak. Issuing from the eastern banks of Lake Wener, and passing through the northern portions of the province of Skaraborg, and northwards from Lake Wetter, through the southern portions of Oerebro to both sides of Lake Mälar, through the northern portions of Södermanland, and the southern of Westmanland, it well-nigh arrived at Upsala and Stockholm. The southern provinces—Kalmar, Jönköping, Linköping, Götheborg, Bohus, and Stora—also bore their share of the epidemic. Having thus advanced 2° northward, it subsided in June only to re-appear in 1858 with still greater violence, visiting Upsala, Westmanland, Oerebro, Wermland, Stora, Gefleborg, spreading more than $1\frac{1}{2}°$ northward, as far as Sundwall. Numerous isolated cases also occurred in Malmöhus, Christianstad, Götheborg, Jönköping, Oestergöthland, Skaraborg, Elfsborg, Södermanland, Westernorrland, and Jämtland, and a very widespread epidemic prevailed in the province of Kronoborgs—a province situated in the extreme south of the country, which had till that time escaped. In 1859, a very striking difference and diminution was perceptible, not alone in the universality of its diffusion, but also in the magnitude it attained in isolated places. Stora and the province of Gefleborg may be taken as the main foci this year; whilst smaller isolated epidemics were observed in Upsala, the province of Skaraborg, and throughout the southern portions of the country. In the following year, 1860, the course of the disease was still more circumscribed, small outbreaks alone occurring in the province of Oerebro, on the northern shores of Lake Wetter, with some isolated cases in other parts of the country. Finally, in 1861, the malady entirely died out in Sweden, sporadic cases alone being recorded.

Of the twenty-four governments or läns of Sweden, during these seven years this remarkable epidemic is recorded to have exempted only two—Westerbotten and Norrbotten—lying in the extreme north. In two of the northern governments which lay next to these—Westernorrland and Jämtland—and in two of those in the south—Gothland and Halland—sporadic cases only had occurred; but throughout the eighteen remaining governments, the epidemic had annually prevailed more or less widely, sweeping away in the seven years no less than 4,138 of the inhabitants.

In Norway, as previously stated, the disease did not appear till 1859. A small but very malignant epidemic then occurred at Opdal, visiting, in the following year Rangsacken, in the same province. With this brief notice, the only record possessed of the Norwegian epidemic, we pass on, merely glancing at a local outbreak of the disease among the garrison in Arnheim, in the Netherlands, in the winter of 1860-61. In the same winter cerebro-spinal meningitis was observed in Portugal,[a] in the hilly districts near the Spanish boundary, at Montforte, whence it spread southwards in a very irregular manner, visiting both Oporto and Lisbon.

It is a curious fact that, though from 1837 the disease was in such close proximity to Germany, it did not obtain a firm footing in this country till 1863. We have the authority of Hirsch, the eminent German historiographer of this disease, for stating, that though in the early part of the present century certain epidemics classed under the title of "acute hydrocephalus" and "encephalitis," are on record, the only reliable information concerning the occurrence of cerebro-spinal meningitis in Germany, before the year 1863, dates from Würzburg, where a number of cases were observed in the hospital and town in the summer of 1851.

In the summer of 1683, cerebro-spinal meningitis broke out in Silesia, at Liegnitz and Neissethale, and, in the spring of the following year, made very considerable ravages amongst the children at Bromberg and Stettin, and among the military and citizens of Berlin. In the winter and spring of 1864–65, it travelled over a large portion of Lower Pomerania, even up to the bounds of Western Prussia, where it became united with the epidemic which had meanwhile broken out there. A few cases also occurred at Czikzyn[b] in December, 1864, and at Graudenz and the surrounding neighbourhood, in the beginning of 1865. Later on in the same year the districts of Behrent, Carthaus, Elbing, Stargardt, Neustadt, the insulated lands called the Nehrung, lying between two branches of the Vistula and the sea—all situated in the

[a] Gaskoin in Lond. Med. Times and Gaz., 1865. Marques in Brit. and For. Med. Chir. Review, 1863. April, p. 389.

[b] Cf. A very able Report upon the Epidemics of Cerebro-Spinal Meningitis prevailing about the lower vistula by John Burdon Sanderson. Parliamentary Paper. No. 435. 1865.

department of Dantzig—the town of Dantzig itself, and its extramural district suffered considerably, the epidemic moving in an easterly direction along the banks of the Vistula and the sea-coast. It also attacked many children and adults in the districts of Konigsberg and Potsdam. In Hanover it appeared in the spring of 1864, in Emden and its environs, and in the following winter and spring visited several places in this kingdom, and in the Duchy of Brunswick. In middle Germany cerebro-spinal meningitis was for a short time observed in Leipzig in 1864. It then died away to reappear during the following winter[a]; and at the same time it attacked Eisenach with great violence, spreading east and west of this town for some distance. Simultaneously during the winter and spring of 1864-65, the disease made considerable progress in Southern Germany, reaching its height in Bavaria, parts of which—for example, Erlangen[b] and Nürnberg—it had visited the previous year; in Hesse, in the district of Gadensberg, Neukirch, and Sontra; and in Baden, in the districts of Rastadt,[c] Carlsruhe, Freiburg, Gengenbach, Offenburg, Säckingen, Constanz, Donaueschingen, Durlach, and in the city of Baden-Baden. It also appeared in the greater part of the south of Bavaria, and in the various palatinates of Franconia; visiting in Upper Franconia the districts of Ebermanstadt, Neila, Forckheim, Kronach, Pottenstein, Bayreuth, Bamberg, Hof, Lichtenfels, &c.; in Middle Franconia, the districts of Erlangen, Hersbruck, Nürnberg, Fürth, Neustadt, Scheinfeld, Uffenheim, Ansbach, Heilbronn, and Schwabach; in Lower Franconia the districts of Schweinfurt, Karlstadt, Rothenbuch, Ochsenfurt, Aschaffenburg, Lohr, Arnstein, Hammelburg, and the districts of Auerbach, and Eschenbach. Augsburg, Türkheim, Oettingen, Regensburg, Landshut, and Munich also suffered during the spring of 1865, and reports reach us of the prevalence of the disease even in many parts of Austria and Hungary.

In the western hemisphere, cerebro-spinal meningitis had remained in abeyance from 1850 to 1856, when we hear of it at Salisbury, in North Carolina; and in the following year in the western and central portions of New York and Massachusets.[d] Within the past few years, however, the disease appears to have extended itself more widely, frequently showing itself among the soldiers of the Federal army, in the winters of 1861-62,[e] and during the same season invading Missouri, Indiana, Kentucky, and Connecticut, numbering among its victims soldiers and civilians alike. During the ensuing winter it visited the troops

[a] Wunderlich in Archiv. der Heilkd., 1864 and 1865.

[b] Ziemssen, Men. Cerebro-Spin. Epidem., 1865.

[c] Niemeyer die Epidemische Cerebro-Spinalis Meningitis. Berlin, 1865.

[d] Cf. Thomas Squire, Saunders and Kendall, in Trans. of State Med. Soc., of New York, 1858. Dickson and Summerhill in Trans. of Amer. Med. Assoc., xii. and xiii.

[e] Cf. Watson, Woodward, Draper, Frothingham, in Amer. Med. Times, 1864.

encamped in, and around Newbern, in North Carolina, and also the negro soldiers who had come with the Federal army to Memphis. Cerebro-spinal meningitis appeared simultaneously in many other states also, in the winter of 1862-63, in La Grange County, and other northern portions of Indiana; in 1863, in Rhode Island and Pennsylvania; in the winter and spring of 1863-64, in Philadelphia; and in many of the northern portions of Pennsylvania, New Jersey, and Ohio; and in 1864 in Vermont and Illinois. During the same period[a] it prevailed in Maryland, Virginia, North Carolina, Alabama, and other Southern States; and evidence is not wanting of its annual occurrence in Philadelphia up to the close of the past year.

To return to our own isle, a remarkable fatal type of the disease appeared in Dublin in March 1866,[b] since which, up to the present time, it has continued to prevail. Outside the city the distribution of the disease has been more or less limited, a few cases only having been reported as occurring in the provincial districts[c] of Celbridge, the Curragh Camp; Naas, in the parishes of Naas, Rathmore, Blessington, and Ballymore; Ballyboggan and Edenderry, in the Edenderry Union; Tullamore, Parsonstown, Templemore, Thurles, Carrick-on-Suir; Tipperary, in the parishes of Emly and Golden; Bagnalstown[d]; Bridgetown, in the Wexford Union; Kilmacthomas,[e] in the County Waterford; Cork, in the Ballincollig and Carignavar Unions; Macroom, Mitchelstown; Killadysart and Ennistymon, in the County Clare; Galway; Trim, and Dunboyne, in East Meath; Drogheda, Dundalk, Ardee; Kilkeel, and Lisburn, in the County Down; Glendermot and Ballymoney, in the Unions of Londonderry and Kilrea; Clondalkin, Rathcoole, Tallaght, Rathmines, Palmerston, Donnybrook, Sandymount, Kingstown, and other parts of the County Dublin. Not a few of these cases occurred among the soldiers[f] quartered in Dublin, at the Richmond and Royal Barracks, and at the Cavalry Barracks, Island-bridge; at the Curragh Camp; and, in a remarkable manner, among those detachments of the "Flying Column" stationed at Birr, sent to check the movements of the Fenians in the early months of 1867.

Cerebro-spinal meningitis has never become epidemic in England. Indeed, so rarely has it been observed there, that the fact of its occurrence

[a] Morrill, Levick, Jewell, Atlee, in Amer. Journ. of Med. Science, 1864. Black and Burns, 1865; Stillé, 1864, 1865, and 1866; Sargent, 1849, &c.

[b] Cf. Gordon, Banks, Law, Wilson, and Report of May Meeting in 1867, at Coll. of Phys., in Dub. Quart. Jour., 1866-67; Banks, Croly, Gordon, Haverty, Law, Hayden, Kennedy, Lyons, M'Dowell, Moore, Stokes, in Dub. Med. Press and Circu. 1866-68, &c.

[c] *Vide* Quarterly Returns of the Registrar-General of Deaths, for 1866-68.

[d] Frayer, J., in Med. Times and Gaz., 1867. Vol. ii., p. 511.

[e] Private information from H. Green, M.D.

[f] Report by Staff-Surgeon Marston in Med. Times and Gaz. Vol. ii., 1867.

in that country might almost be passed over in silence. In 1807, Gervis,[a] of Ashburton, reported four cases. Scott[b] states that he saw cases of a similar nature at Sunderland, in 1830; and Richardson,[c] one at Mortlake, in Surrey, in 1843. A few were noticed in 1846, at Liverpool, by Whittle, and at Rochester, by Browne; at Stafford, in 1859, by Day;[d] in 1867, at Bardney, in Lincolnshire, by Lowe[e] and Woolley;[f] at Devises by Clapham;[g] and at Chelsea by Crisp.[h] In the metropolis a single case was observed by Wilks, in each of the years 1856, 1858, and 1859;[i] seven cases, in 1865, by Wilks, Ogle, Murchison, and Martin; a few,[k] in 1866, by Murchison, and Baümler; one, in 1867, by Clarke, and in 1868 by Wilks.

If we now glance at the diffusion of cerebro-spinal meningitis upon European soil during the present century, we find that Turkey, Greece, Belgium, Scotland, Iceland, and Russia alone, so far as our present limited information warrants such an assertion, have remained unscathed. Outside of Europe we hear of the disease only in Canada, the United States of North America, and the North Western shores of Africa.

In the foregoing brief history of the appearance and diffusion of cerebro-spinal meningitis, many peculiarities are noticeable, which essentially distinguish it from other epidemics. Its simultaneous appearance in places widely separated, so widely separated indeed as to have no channels of intercommunication; the singular exemption, during an epidemic, and subsequently, of the intermediate, and frequently of the surrounding districts; its occurrence, whether in numerous or isolated cases, simultaneously or otherwise, in many separate quarters of the same locality without any effort at concentration; the great variableness of its duration, of its extent, and of its intensity; the irregularity of its progress; its fluctuating character, manifested in frequent exacerbations and remissions, with too often all absence of any gradual increase or decline; its generally admitted non-contagious, or very slightly contagious nature; and its independence of all geographical limits, local causes, or indeed as yet of any appreciable causes whatever, constitute it truly a disease, *sui generis*.

[a] Med. Chir. Trans., 1811, ii., p. 234.
[b] Lond. Med. Times and Gaz., May, 1865.
[c] Social Science Review, May, 1865.
[d] Clinical Histories, 1866, pp. 3-7.
[e] Lancet, 1867, p. 790, Vol. i.
[f] Lancet, 1867, p. 130, Vol. ii.
[g] Med. Times and Gaz., Vol. i., 1867, p. 709.
[h] Med. Times and Gaz., June, 1867. [i] Lancet, April, 1865.
[k] Murchison in Med. Times and Gaz., Vol. i., p. 483, 1867. Baümler in Med. Times and Gaz., Vol. ii. p. 58, 1867. Clark in Lancet, July 13th, 1867. Wilks in Med. Times and Gaz., May, 1868.

So many and so varied are the guises assumed by cerebro-spinal meningitis, owing to the varieties in form, grouping, severity, and number of the individual symptoms and physical signs, that it seems difficult to form with success any classification which would comprehend established types, definite stages, or even certain varieties in form of the disease. Many such attempts have, indeed, been made; yet, the phenomena which characterize these types, stages, and forms, are so frequently, in part or altogether, wanting, or commingled, that such artificial classifications are calculated to prove barriers rather than helps to the study of the disease. In this report, therefore, we will confine ourselves to a brief account of the individual symptoms and signs, taking them in the order of their occurrence, as far as this is at all possible, and with the aid of such illustrations as may have occurred within our own sphere of observation.

It has been observed that in a large proportion of cases the malady suddenly manifested itself with more or less severity without any premonitory symptoms, frequently setting in during the night; or the patient was suddenly seized during the day while following his ordinary avocations, in the midst of work, during meals, in the street, while at school, or at play, with shiverings, vomiting, and headache. A boy, aged eleven, who died in the Meath Hospital during the present year from this disease, gave the following curious account of the commencement of his illness:—Coming home in the middle of the day, he stated that while out he had been frightened by the vision of a black man, "so tall that he could not see the top of his head;" that this man had in some way menaced him, and that in consequence he had run home. Immediately after he began to complain of intense pain in his head, and the disease ran its fatal course in sixteen days. The duration of premonitory symptoms, when they occur, is very variable, lasting from a few hours to as many days. Among these symptoms are—headache, stiffness of the neck, a feeling of formication, giddiness, rigors, great prostration of strength, great pain in the abdomen, and, above all, vomiting. Regarding the time at which the disease first manifested itself, such contradictory statements exist that, upon this point, no definite conclusions can be formed; nor is this a matter of much regret.

The rigor which ushers in the disease, though usually the precursor of an increase of temperature, too frequently is succeeded by a state of collapse, during which the characteristic signs of the malady develop themselves. When this does not happen these signs appear gradually, or more rapidly, the greatest difference being observed in the time of their occurrence. Of them, whether as regards priority, constancy, prominence, or persistence, pain in the head undoubtedly ranks the first. Its distribution, character, and violence varies much in different cases; sometimes, too, it is influenced by posture and by pressure. It generally

continues, not alone throughout the whole course of the illness but far into the stage of convalescence, oftentimes exhibiting a distinctly remittent or intermittent character; and a return of this symptom, in company with those of vomiting and convulsions, but too frequently points to the issue of the disease in hydrocephalus—facts which receive ample conformation in the case of the boy Dooley. It must, however, be borne in mind that, though in many cases persisting throughout, it bears no proportion to the violence of the other symptoms, being only slightly marked in some rapidly fatal cases, while in others of a much milder nature it is observed in its greatest intensity.

Vertigo is not unfrequently associated with headache. A curious case of rotatory convulsions from this cause is recorded by Forget,[a] and other observers have found it occasionally highly marked. In connexion with this case of rotatory convulsions, it may be stated that the experiments of Brown-Séquard go to prove that they often depend upon irritation of certain portions of the auditory nerve, medulla oblongata, pons Varolii, and other parts of the base of the encephalon. Delirium is generally noticed in severe cases, though presenting many varieties in degree and form. It seldom continues during the whole illness, vanishing and again returning and alternating with other symptoms. The character of the delirium is frequently furious, so that the patient can only be kept in bed by the imposition of some restraint. At other times he lies still, muttering disjointed words and sentences, easily awakened when sharply addressed, but again relapsing when left to himself; or it may assume the form of illusions from which the patient may only awaken to find himself convalescent. In the *foudroyante* form it is sometimes wanting, the patient quietly sinking into coma and continuing in this condition till he dies.

A general state of restlessness, and more or less persistent loss of sleep, are symptoms also deserving of notice—so much so, indeed, that the occurrence of a long and quiet sleep has come to be regarded as of decidedly favourable import.

At the commencement of the illness, particularly in the rapidly-fatal cases, coma sometimes stands out so prominently as to have obtained from some writers[b] a special acknowledgment under the designation of "comatose cerebro-spinal meningitis," the patient sinking into a state of utter unconsciousness, and either soon succumbing or waking in delirium at a later period. Occurring at a more advanced stage of the disease, and ushered in by violent headache or delirium, it frequently passes off to be succeeded by a fresh attack of delirium; and continual alternations of coma and delirium may thus be observed. When unbroken, however, especially when it is accompanied by signs of paralysis, its unfavourable omen is generally too manifest. Of the few cases which have emerged

[a] Gazette Médicale de Paris, 1842, No 15-20.

[b] Tourdes, Forget, &c.

from this condition, as complete consciousness returned, some, oblivious of their previous sufferings, have found that in the course of their malady they have become paralysed; others that they are bereft of sight or of hearing, or even of both together; while others, again, that they are so morbidly sensitive that light and sound and all other external impressions are painful; or even, escaping these consequences, that they are in a wretched state of weakness from which they very slowly recover. In not a few instances, however, the stupor is imperfect, and is hardly deserving of so strong a name.

One of the most characteristic symptoms which accompanies the headache is pain in the spine. At first generally manifesting itself by more or less pain and stiffness of the neck, it is, in many instances, wholly confined to the cervical region. Indeed, though often uniformly diffused over the whole spine, it seldom has for its special seat either the dorsal or lumbar regions. The rhachialgia is generally increased by movements of the head or body, or by pressure upon, or at the side of, the spinous processes of the vertebræ, especially in the cervical region. It may last throughout the whole course of the disease, or be limited to its early periods; or again, it may continue even after convalescence, as in the cases recorded by Niemeyer and Hirsch. The fixed or flitting pains experienced in the limbs and body stand evidently in close relation with the pain in the spine, often seeming to radiate therefrom, and even sometimes being produced by pressure upon the spinous processes. Acute pain in the knee was particularly complained of in several of the cases which came under our notice; and this symptom has been dwelt on at considerable length lately by an American physician[a] in connexion with ordinary meningitis.

The pains in the spine and limbs, indeed, are sufficiently remarkable, but still more so is that tetanic condition of the cervical muscles which frequently is their accompaniment. Foreshadowed in many cases by a stiffness of these muscles, so striking and so constant are the phenomena thus presented in their full development that in Germany and Sweden they have given a designation even to the disease itself—(Nackenstarre, Genickkrampf, Nacksjuka, &c). The contraction sometimes proceeds so far that the head is retracted, so as almost to form a right angle with the spinal column; and any attempt to bend it forwards is attended with the liveliest feelings of pain on the part of the patient. From this extreme retraction of the head to simple rigidity or stiffness of the neck every degree of contraction may occur; and so frequently is this phenomenon exhibited that it has justly been regarded as the most characteristic sign of the disease, no less by those within than by those without the profession. An enumeration of the various descriptions of this sign adopted by those who have witnessed cerebro-spinal meningitis in the many

[a] Fisher.

countries where it has prevailed would leave no doubt whatever upon this point. Indeed, it is owing to this characteristic that the disease has been, and is capable, in many instances, of being accurately distinguished from the numerous diseases with which it has from time to time been confounded, and under whose names it has been described. Within the last few years an interesting question has been started by Burdon-Sanderson. In his able report[a] upon the North German epidemic he has endeavoured to show that this contraction of the cervical muscles is a direct consequence of the pain that is so frequently complained of in this region. We do not hesitate to affirm our disbelief in this theory; for no circumstance, as Hirsch remarks, is more evident than that the severity of the spasm and of the rhachialgia bear no relation whatever. Not long since, indeed, we had an opportunity of witnessing an ample confirmation of this fact, which in many respects was so remarkable that it seems worthy of notice here.

Mary Anne Crispie, aged six, came home from school, complaining of violent pains in her head and belly. These symptoms, that night, were followed by vomiting and delirium, with intense heat of skin. Four days subsequently, when visited by her medical attendant, she was found lying with her head far retracted, so as to form well-nigh a right angle with her body, tossing herself about very restlessly, and extremely sensitive to the slightest touch. She was admitted into the Meath Hospital upon the eighth day from the commencement of her illness. The only signs she then presented—and they were sufficiently characteristic—were extreme retraction of her head, with rigidity of the deep cervical muscles, so that her face was directed upwards towards the head of the bedstead upon which she lay; slight elevation of temperature (101°), and of the pulse (100); considerable opisthotonos; and an eruption of a few vesicles of herpes on the lips. She complained of no pain whatever in the region of the neck or back, and, when asked the question, stated that there was none; nor, during the remainder of her stay in the hospital, which lasted over a fortnight, did such pain ever occur, save, as might be imagined, when endeavours were made to bend the head forwards. The opisthotonos disappeared, and the retraction of the head gradually diminished, undergoing at times well-marked exacerbations and remissions. She was removed from the hospital finally, at the wish of her friends, still having her head slightly retracted, but otherwise exhibiting no sign of the disease.

The retraction of the head seems to be only a variety of the other tetanoid phenomena, such as opisthotonos, pleurosthotonos, emprosthotonos, and trismus, which less frequently exist. The opisthotonos sometimes is so marked that, as happened in a case under the care of Dr. Gordon, and another under Dr. Stokes, the patient lay on the

[a] Page 12.

abdomen, and refused to be moved from this position. In the first of the two remarkable instances here alluded to, not only the spine, but the head also, was retracted to a wonderful degree; and as so frequently, not to say invariably, happens in similar cases, all changes of position were resisted on account of the violent pains in the spine and other parts of the body, occasioned thereby. The contraction and stiffness of the neck continue usually, with more or less uniformity, during the whole course of the illness, sometimes even far into convalescence, remitting perhaps, or intermitting, and, in not a few instances, have long persisted after all other traces of the disease had disappeared. The same uncertainty of duration characterises the opisthotonos, as indeed, all the other signs of cerebro-spinal meningitis, cases being recorded by Hirsch, and more recently by Stokes[a], of its persistence during even the fourth and sixth week of the malady.

With regard to the cause of these tetanoid phenomena, Stillé, in his recent treatise, has asserted that these, together with the rhachialgia, "orginate in the same spinal lesions, congestion of the membranes of the cord, or its compression by an effusion of serum or of lymph, or by changes in its proper tissue." We cannot concur in this opinion, as, even in our own experience, cases have occurred unattended by any opisthotonos or contraction, or even stiffness of the neck, although the exudation upon the membranes of the brain and spinal marrow was singularly profuse; and the converse of this proposition is equally true. Nor can it be imagined that mere congestion of the cord or its membranes is sufficient to produce these phenomena; as, if such were the case, they should generally be present in cases of *meningite foudroyante*—those cases of all others in which they are absent—where the morbid appearance almost invariably presented is congestion, of varying degree, of the cerebral and spinal pia mater, and of the brain and spinal cord. Moreover, in tetanus it has often happened that no lesions whatever have been found after death, even by very experienced observers.

Trismus, as also local or general tonic spasms are often associated with these phenomena. The chief seats of spasm are the muscles of the upper, and less frequently those of the lower, extremities, and the muscles of the face, causing the peculiar expression of countenance so characteristic of tetanus. The patients almost invariably lie upon their side, with the thighs spasmodically flexed upon the abdomen, and the legs upon the thighs. So powerful sometimes is the spasm, that the anterior part of the thighs comes almost in contact with the abdomen, while the heels are drawn up, so as to touch the back part of the thighs. We have particularly noticed this during the recent epidemic, and cannot but regard it as one of the many signs referable to the spinal affection.[b]

[a] Vide proceedings of Coll. of Phys. in Dub. Quart. Journ. Aug. 1867, p. 226.

[b] Cf. Brown-Séquard. Phys. of Nerv. Syst., p. 114.

Convulsions have also been observed, though less commonly than tonic spasms. They vary greatly in degree, being either confined to single groups of muscles—for example, those of the face, eyes, or extremities—or attacking simultaneously various portions of the body, or even appearing as general or epileptiform convulsions. Sometimes occurring on one side of the body only, they are associated with paralysis of the opposite half. Sometimes, again, as Schuchard[a] has pointed out, they are purely reflex, being occasioned by violent movements of the patient, a blast of wind, a bright light, or the mere touch. Even when general, they are not necessarily of fatal augury; for, they often occur at the commencement of the attack in patients who recover, and Hirsch has observed them as frequently in mild as in severe cases. On the other hand, a long continuance of convulsions is a very unfavourable sign, as well as their occurrence at a late period, as previously remarked. Not long since a remarkable morbid specimen of the disease was submitted to the Pathological Society of Dublin, by Dr. Stokes, which would not here be noticed were it not that the case presented the very striking phenomenon of continued and violent convulsions during the whole of the brief course of the illness. Such cases, from their exceeding rarity, are well deserving of special notice. A similar case is not alluded to, in so far as we have been able to discover, in any of the works of those who have had the largest experience of the disease.

Paralyses are not of common occurrence. Many authors have not even mentioned them; while others draw attention to their rarity despite the anatomical lesions. Ptosis, strabismus, paralyses of the bladder and rectum, of the muscles of deglutition, articulation, and of the extremities, facial palsy, hemiplegia, paraplegia, and even general paralysis have been observed. Aphasia, also, has been recorded by Hirsch and Hayden. Slight and temporary paralyses of single portions of the body have at times appeared early, but they generally show themselves at a much later period, while general paralysis is usually the immediate precursor of dissolution. Wunderlich, however, records an interesting case of a man who, on the second day of his illness, became the subject of partial paralysis of the left arm, as well as of complete loss of motion and sensation in the lower extremities and over a large portion of the body. Even thus the man did not succumb, nor did the paralysis quickly disappear, for we are told that five months afterwards he had only partially regained his muscular power. Other writers likewise report cases where the paralysis of the extremities continued as a sequela of the illness for a long period.

Affections of the special organs of sense, when they occur, are among the most striking and distinctive phenomena of cerebro-spinal meningitis,

[a] Hannov. Zeitschr. für Heilkd. 1865, p. 263.

placing it in very marked contrast with the continued fevers, with which it has too frequently been confounded.

Foremost among these complications are the affections of the eye and its appendages. Wilson has drawn attention to the enormous swelling of the eyelids which sometimes occurs. This seems to be only one of the results of the intense conjunctivitis which has so frequently been observed in many of the foreign epidemics, as well as more lately in Dublin. Too frequently, however, it happens, that conjunctivitis and interstitial keratitis are only the harbingers of still deeper seated mischief of the most formidable character, partaking of the nature of choroido-iritis, and resulting in opacity of the lens or of its capsule, with synechia posterior or closed pupil, separation of the retina from the choroid by serous effusion, choroidal degeneration, obscurity of the media, with sometimes purulent infiltration, and even atrophy of the globe. It need hardly be stated that under these circumstances blindness generally results; and when we consider the violent character of the choroido-iritis—for this is the inflammatory condition affecting the deeper structures which most frequently is met with—and the many consequences it entails, it is not to be wondered at that comparatively few of these cases recover without more or less loss of vision. The following remarkable instance of this affection came under our notice:—

Mary Hastings, aged fifteen, was admitted into Sir P. Dun's Hospital in a state of partial stupefaction on the first day of her illness, having been suddenly attacked with intense headache, persistent vomiting, and a feeling of pain and constriction on the right side of her chest. On the following day the peculiar dark purplish eruption, slightly raised and indelible on pressure, which has so frequently been observed during the recent epidemic, had made its appearance upon various parts of the body, more especially upon the legs, thighs, and forehead. Upon the fourth day stiffness of the neck and retraction of the head, with rigidity of the deep cervical muscles, manifested themselves; and as on the previous day the patient lay upon her abdomen, occasionally moaning, muttering, and tossing herself about uneasily; nor could she be induced to move from this posture. On the fifth day both wrists and the left elbow joints appeared red, swollen, and tender, apparently from effusion into the joints as well as into the surrounding tissues. Intense injection of the conjunctiva, with swelling of the eyelid, but without any increased secretion of mucus; patches of interstitial opacity of the cornea; discoloration of the iris, with some opacity of the capsule of the lens; and blindness of the left eye, unattended with any pain, had suddenly supervened. The right eye was perfectly normal. She was also very deaf. The following day the cornea had become more opaque; pus lay in the bottom of the anterior chamber; the iris was duller and more discoloured; the pupil small, irregular, and unaffected by a strong

solution of atropine; and the capsule of the lens still more obscure. Suffice it to say that almost complete blindness of this eye resulted, the pupil remaining small, irregular, and more or less adherent to the opaque capsule of the lens. The deafness on both sides, unaccompanied by any pain or purulent discharge from the ears, increased. Her left knee became swollen and tender, and she finally fell into a state of extreme marasmus. Exacerbations and remissions of the febrile symptoms frequently manifested themselves. Erysipelas of the head and face supervened towards the close of the illness, and her convalescence was extremely protracted. In the end, after a stay of four months, she recovered, and quitted the hospital nearly blind of the left eye and completely deaf. At the present date, a year subsequent to her illness, the pupil of the left eye is much smaller than that of the other, and is only very slightly influenced by light. Under the influence of atropine it enlarges to a considerable extent, but its edge is extremely irregular owing to adhesions. Viewed by transmitted light the capsule of the lens is opaque, and the opacity is greater in some points than in others. No illumination of the fundus results when light is thrown upon the pupil from the mirror of the ophthalmoscope. Examination of the state of the fundus, therefore, is not possible. She has, however, partially recovered her sight, and is able to distinguish the outline of objects held close to her. The deafness on both sides is as complete as ever, and the site of many of the spots is evidenced by a perceptible pitting of the skin.

It is noticed by one writer[a] that in all his cases the right eye was the one affected. The case here related is, however, a sufficient proof that the right eye cannot be considered as the only one which may be the subject of inflammation. We have in other cases also witnessed the results of this terrible affection upon the left eye. Amaurosis, temporary or permanent, is not an uncommon sequence of the disease; nor should this be a matter of surprise, as it has been shown by Mampe, Kreitmaër,[b] and more recently by von Gräefe,[c] to depend frequently upon exudative choroiditis and consequent detachment of the retina. We have also seen cases in which this symptom was apparently dependent upon atrophy of the optic nerve of cerebral origin.

Various opinions have been advanced regarding the cause of these inflammatory conditions of the eye. Wilson is inclined to attribute them to metastasis such as he has observed in puerperal fever and other pyemic affections. Others regard the conjunctivitis as the result of lagophthalmos. A fatal objection to the universality of such a theory is that, in many cases, as in that of Mary Hastings, no such lagophthalmos

[a] Wilson. Dub. Quart. Journ., May, 1867.
[b] Bayr. ärztl. Intelligenzbl. 1865, No. 30.
[c] Verhandl. der Berl. Med. Gesellschaft I., p. 58.
Die Epidem. Cer. Spin. Meningitis. Berlin: 1865.

existed. But we do not deny that such may sometimes, yet we believe rarely, be the cause of the inflammation of the conjunctiva and cornea. Von Gräefe considers the choroiditis as the direct result of the spread of the purulent infiltration from the cavity of the cranium along the optic nerve; while Niemeyer, of Baden, regards all these various affections of the eye as the result of alterations of its nutrition, owing to the extension of the inflammation to the neurilemma of the trigeminus. He points out that the inflammatory changes in the eye, which have been enumerated, are exactly equivalent to the results which have been experimentally obtained by section of the Gasserian ganglion. The acceptation of this exceedingly ingenious explanation, however, is not unattended with difficulty. One would imagine, on anatomical grounds, if this theory be correct, that more or less facial anesthesia on the same side should also result. Yet such is not the fact, for we ourselves have witnessed the two opposite conditions in this disease of ocular inflammation without facial anesthesia, as in the case of Mary Hastings, and again of facial anesthesia without ocular inflammation, as in the case of Thomas Devine.

In the notice of the paralyses allusion has been made to strabismus and ptosis, which are the most frequent of these lesions of motion. During the epidemic in North Germany Burdon-Sanderson observed twelve cases of temporary strabismus, in eleven of which it was convergent. Double vision existed in all. In other epidemics even triple vision has been noticed. Divergent strabismus has been met with by Banks and others; and even both eyes have been found affected. In some epidemics strabismus has been much more frequent than in others; thus it was in the epidemic at Dantzig, whereas in the epidemics at Strassbourg, Baden, and lately in Dublin, it was uncommon. It appears to be dependent upon local lesions affecting the third and sixth nerves, which supply the recti muscles of the eyeball, due either to inflammation by continuity of their neurilemma, or more probably to the effects of pressure or contraction of the exudation which is found enveloping them. Ptosis, from lesions of the third nerve, is even more common than the strabismus with which it frequently is associated. Of the sixteen cases recorded by Mannkopff[a] in his recent memoir, two exhibited this phenomenon on the second and third days of the illness. In one case the ptosis was accompanied by convergent strabismus upon the same side, while in the second the same form of strabismus affected the opposite eye; in other words, lesions of the third and sixth nerves, on the same and on opposite sides respectively, coexisted. Ziemssen of Erlangen also has observed numerous instances of lesions both of the oculomotor and abducent nerves. Lagophthalmos from paralysis of the orbicularis

[a] Über Mening Cerebrospinalis Epidem. Braunschweig, 1866, p. 146, 147.

palpebrarum, generally transient in character, has also, in some rare instances, been met with in connexion with Bell's paralysis. This was noticeable in the case of the girl Mary Frances. The rarity of these paralyses during the recent epidemic may be judged from the fact that, among the thirty-seven cases placed on record at the May meeting of the Medical Society of the College of Physicians last year, only two instances of partial strabismus, one of partial ptosis, and two of incomplete facial palsy are alluded to. It remains to notice the condition of the pupils. As is the case in other cerebral affections, this is far from constant. They may be either dilated or contracted, or one contracted and the other dilated, or again, perfectly normal. No condition then of the pupil is peculiar to the disease, save, perhaps, the condition of sudden alternate dilatation and contraction, as noticed during the early American epidemics.

Affections of the organ of hearing are far from uncommon. According to some writers they are decidedly more frequent than disorders of vision. Tinnitus, and pain in the ear, attended with difficulty of hearing, are sometimes experienced early, and later on deafness, with or without pain, tinnitus, or otorrhea. This deafness in one or both ears, like other symptoms, often appears to vary considerably from day to day, and it either slowly passes away or remains as one of the incurable sequelæ of the malady. In many cases it cannot be accounted for by any changes in the membrana tympani and external ear; but the state of this membrane has unfortunately been little attended to, owing to the neglect of the use of the speculum. Acute otitis, or inflammation of the lining membrane of the cavitas tympani, was once observed by Ziemssen on the twenty-fifth day of the illness. On the thirty-sixth, the pent-up matter, having burst through the membrana tympani, was discharged externally. Cicatrization of the opening in the membrane subsequently took place, and slight difficulty of hearing only remained. We had an opportunity of watching but one case in which deafness on both sides manifested itself early. In this instance the deafness was unaccompanied by any pain in the ear, tinnitus, otorrhea, facial paralysis, or visible alteration in the membrane tympanorum, and gradually increased in intensity. When the patient left the hospital, towards the end of last year, after a very protracted convalescence, the deafness upon both sides was then, as it still continues, complete. This case has been more fully entered into on a previous page. In it were found associated the strange phenomena of complete deafness on both sides, and of blindness of one eye—phenomena, as it appears, of sufficiently rare occurrence.

It is difficult to believe that the deafness in all cases is dependent upon inflammatory changes in the ear, as Burdon-Sanderson[a] would suggest.

[a] Parliamentary Reports, 435, 1865.

The absence of pain, of otorrhea, of tinnitus, of facial paralysis, the early appearance, and the, as it were, spontaneous nature of the deafness in many cases, as in the one which we have given, seem opposed to this view. In a few instances, however, Jackson and Warren have observed purulent discharges from the ear; and the autopsies of Klebs and Lissauer[a] undoubtedly demonstrate the inflammatory nature of the affection in the cases they have detailed. Stillé[b] holds with Niemeyer and Ziemssen[c] that this condition appears to depend chiefly upon the pressure of the plastic exudation, in which the auditory nerves are embedded either in the fourth ventricle or after their exit from the brain; while Mannkopff thinks it more probably is due to softening of the nervous substance of the medulla oblongata, which forms the floor of the fourth ventricle. It is not easy to understand why, if such were the case, both portions of the seventh nerve should not usually suffer; yet the co-existence of deafness with lesion of the portio dura and the converse is anything but common. It seems very probable that all or any of these supposed causes may sometimes variously operate, and that the explanation of the deafness is not in all cases to be sought for in the same pathological condition. In the absence of more extended researches we can now only rely upon the results of the *post mortem* examinations of Klebs and Lissauer, from which it would appear that the loss of hearing was the result of inflammation of various portions of the tympanum and labyrinth.

It does not, however, always happen that blindness or deafness are the lesions of the organs of sight or of hearing from which the patient has to suffer. On the contrary, morbid acuteness of hearing, as of vision, is sometimes experienced, so that all impressions of sound, as of light, are painful and intolerable—conditions closely analogous to the cutaneous hyperesthesia.

Indeed, of all the lesions of the special organs of sense, none are more remarkable than the lesions of cutaneous sensibility, and foremost among these the peculiar exaltation of cutaneous sensibility which usually manifests itself shortly after the commencement of the illness. Many even go so far as to say that it is absolutely characteristic of the disease; but such is far from being the case. During the recent epidemic it was rarely absent. Sometimes the whole, sometimes portions only of the body were sore to the touch; and in extreme cases the slightest movement caused exquisite pain. Sometimes even the mere touch, as Hirsch states, seems capable of recalling to consciousness patients in whom this faculty was well nigh extinguished. We cannot agree with Burdon-Sanderson in regarding it as a mere consequence or interlude of the

[a] Mentioned in Burdon-Sanderson's Report.

[b] Epidemic Meningitis, Philadelphia, 1867, p. 46.

[c] Deutsch. Archiv. für Klin. Med. I. 72, 346.

pains which are so remarkable. Exaltation of the muscular is as common as that of cutaneous sensibility; and the distinction can be made on the one hand by making deep pressure, on the other by pinching up a fold of skin. The opposite condition of anesthesia has been rarely noticed, save in connexion with paralysis.

Disorders of the remaining organs of sense are very uncommon. They have, however, been occasionally noticed; for, Corbin[a] has observed, loss of the sense of taste, and Ames[b] loss of that of smell in one nostril, with a purulent discharge from the nose.

The most prominent and most constant of the signs presented by the digestive organs is vomiting. As was previously stated, it is almost invariably observed during the premonitory stage; and in very many cases the onset of the disease dated from its occurrence. Usually the patient is attacked by vomiting, without any previous feeling of nausea; sometimes, however, a frequent and distressing nausea and inclination to vomit is alone complained of. During the first twenty-four hours it occurs with more or less frequency, being often excited merely by the patient's raising himself up. It seldom continues during the entire course of the illness, but recurring at a late period with increased or renewed pain in the head and convulsions, as in the case of Dooley, it furnishes one of the most important signs of hydrocephalus. The matter discharged from the stomach has been very frequently a greenish fluid, containing at first whatever remained in the stomach. American and European writers are equally agreed upon this point. In our experience this was the character of vomiting almost invariably met with, the matters vomited being in many instances expressively described as being "as green as the grass." In other cases the ejecta consisted only of a white viscid fluid resembling mucus, or of the contents of the stomach. The quantity of fluid vomited has sometimes been peculiarly copious; and in these cases regurgitation rather than vomiting has been observed. As regards its import, its occurrence oftentimes without previous nausea being called forth, and increased by the act of rising, its peculiar greenish character, its great frequency, its early occurrence, its association with pain in the head, furious diarrhea, and other cerebro-spinal phenomena, and the absence of epigastric tenderness, all alike denote its sympathetic character and its cerebral origin.[c]

The tongue presents no characteristic appearance. Great differences have been found in the degree of thirst and loss of appetite in individual cases. Sore-throat has been mentioned as a not infrequent symptom in the American epidemics. Redness of the gums and fauces with or

[a] Gazette Medicale de Paris, 1848, p. 435.
[b] Paper on Epidemic Meningitis, Montgomery, 1848.
[c] Vide Graves' Lectures, Neligan's Ed. p. 128.

without swelling was observed. We only found this complained of in one case—that of W. H.—in which the fauces, upon examination, appeared of a deep red colour. Levy also speaks of a thin, pearl-coloured whitish exudation upon the mucous membrane of the gums and fauces. Apthæ have been occasionally observed. Swelling, with or without suppuration, of the parotid, submaxillary, and cervical glands is rare, and generally fatal. Epistaxis[a] has sometimes been so considerable as to place the patient in imminent danger. More or less obstinate constipation has been usually noticed, a circumstance in which this disease resembles other forms of meningitis. The opposite condition has been much less frequent. During the epidemics at Strassbourg and in Sweden, profuse diarrhea was not uncommon, sometimes at the commencement of the illness, but generally at a much later period. During the late epidemic in Dublin, violent purging and vomiting often ushered in the attack;[b] but, like the vomiting, the purging soon ceased, and, during the remainder of the illness, the bowels usually were either natural or confined. Hemorrhage from the bowels has been noticed in a few fatal cases. Jaundice has been so rarely alluded to, that it merely deserves a passing notice. It was particularly remarked by Besseron[c] in the Algerian epidemic in 1847, and is ascribed by him to the eminently bilious diathesis then prevailing. The meteorism which at times distresses the patient is often associated with painfulness of the abdomen to the touch, the abdominal muscles at the same time being usually flattened or spasmodically retracted. Wunderlich and Mannkopff specially allude to the frequency of enlargement of the spleen; but other German writers have not verified this by their experience. In this country, it has very rarely been noticed, and appears to be an accident rather than an essential part of the disease.

The urine was in no respect characteristic or uniform. Sometimes diminished in quantity, at other times profuse, or depositing a copious sediment of lithates, uric acid, or triple phosphate, it was either retained or passed away involuntarily, owing to paralysis of the bladder or of its sphincter. In not a few instances it has been found albuminous, containing blood corpuscles and casts of the uriniferous tubules, which, in some cases, may have been due to the renal irritation caused by cantharides absorbed from the blistered surfaces. The same phenomena have, however, been observed where blisters had not been applied. Pus also occasionally has appeared in the urine. In one of our cases, that of W. H., the deposit was found upon the eighth day to consist wholly of pus, and it is much to be regretted that leave could not be obtained to inspect the abdominal viscera. It is also to be observed

[a] Githens Amer. Jour. of Med. Sciences. July, 1865, p. 93.

[b] Vide cases.

[c] Gaz. Méd. de Paris. 1847, p. 514.

that, in this case, pus, or greenish lymph, was found deposited in the tissues surrounding several of the joints. The occurrence of sugar in the urine was once observed by Klebs[a] and by Mannkopff.

The function of respiration, and the respiratory organs, are frequently deranged from several conditions, and in several modes, in cerebro-spinal meningitis. Though commonly normal, both in its character and its rate, at times the respiration assumes the well-marked cerebral character which has been so faithfully described by Graves,[b] as occurring sometimes in the course of the continued fevers. This cerebral character, which was observable in several of the cases which came under our notice, is the only condition of the respiration which appears to demand particular mention. Among the secondary affections of the respiratory organs which have most frequently attracted attention, are bronchitis, broncho-pneumonia, hypostatic congestion, œdema, and apoplexy of the lungs. Pneumonia and pleuritis have very seldom even been alluded to. Hirsch shrewdly remarks that they sometimes manifested themselves so slowly that they were first demonstrated in the examination of the body after death. At Philadelphia lately, however, pneumonia seems to have been not an uncommon complication.

In connexion with deviations from health of the respiratory, those of the circulatory system may, with greatest advantage, be considered, not alone on account of their close anatomical connexion, but from the mutual dependence of the functions of each upon those of the other. Besides the exceedingly rare occurrence of pericarditis, the variation in the heart's action and in the ratio of the pulse and temperature, demand notice. Sometimes the initiatory chilliness or rigors, by which the disease is generally ushered in, are but faintly marked; while not infrequently chills, sometimes even amounting to rigors, succeeded by heats, are experienced many times by the patient during the course of the illness. So great are the variations which are manifested in various cases and at various periods in the conditions of the pulse and temperature, that any attempt whereby these might be shown to be in any way characteristic of the malady, should such even be possible, seems practically of little importance. After some experience, we believe that so much value should not be laid upon particular curves of temperature, as diagnostic of certain febrile conditions, as some would endeavour to persuade us. Even as we believe that no condition of the pulse, in like manner, we hold that no condition of the temperature is characteristic of any one disease; and such attempts, from the want of success consequent thereon, too frequently lead to the rejection, as worthless, of the thermometer. The same spirit that should lead to the study of the varying conditions of the pulse should lead to the study of the variations of the tem-

[a] Virchow's Archives. Bd. 34, p. 395.

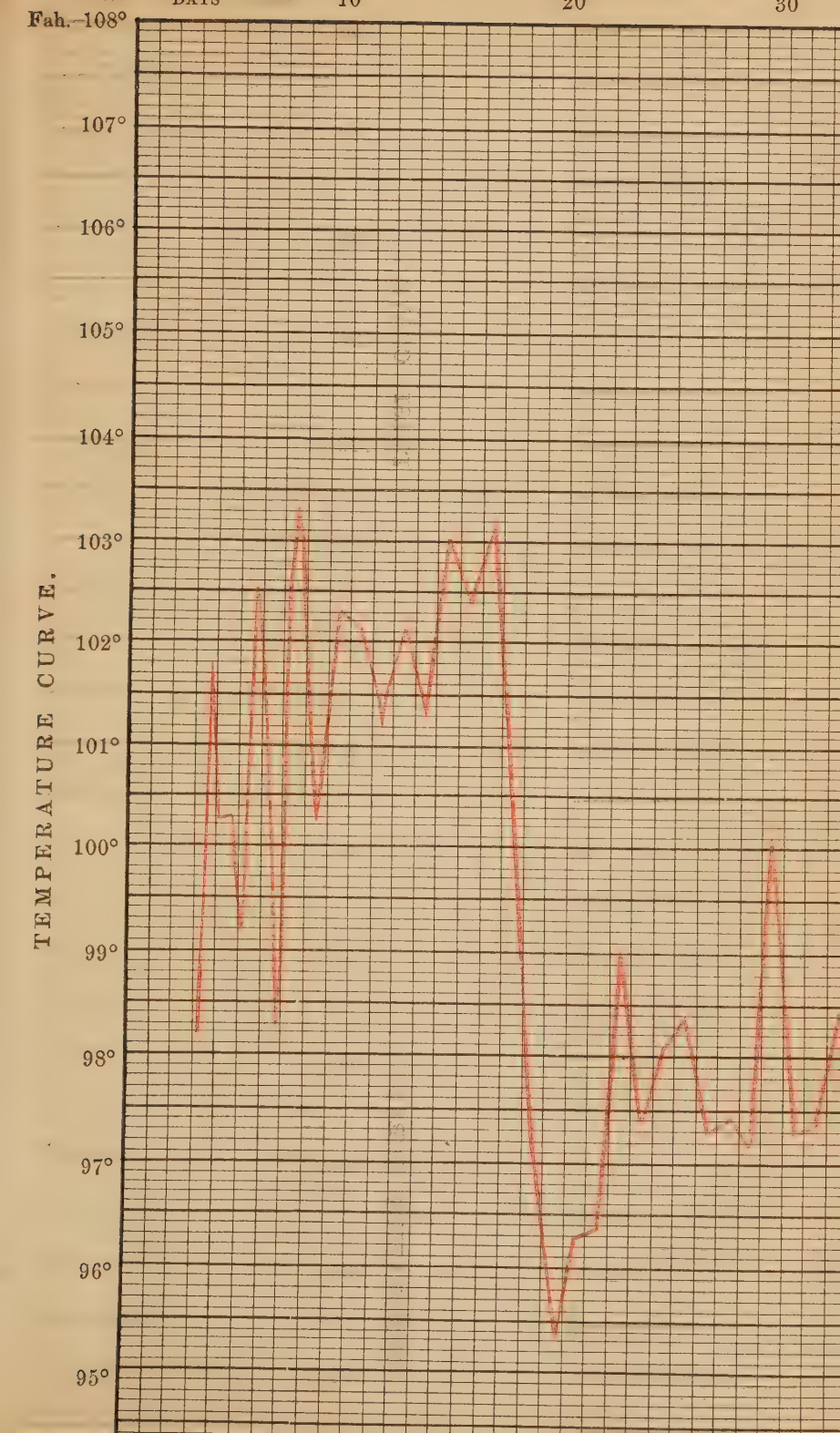
[b] Clin. Lec., Ed. Neligan, p. 116.

perature, not, indeed, for the purpose of furnishing means of diagnosis, but for their intrinsic and relative value in connexion with other phenomena.

As regards the pulse—its frequency, its force, its volume, its regularity and other qualities, are subject to repeated, and often inexplicable, changes. In frequency we, in almost every case, found it greater than natural, as may be seen by consulting the annexed charts. As in other diseases attended with extreme debility, the least muscular exertion, or change of posture, increases its frequency and alters its rhythm; and the same increase is also noticeable during the paroxysms of pain. This want of regularity, which is remarkable in the behaviour of the pulse, is also witnessed in the varying conditions of the temperature of the body. To Wunderlich and Ziemssen, in Germany, and, subsequently, to Hirsch, Burdon-Sanderson, Niemeyer, Mannkopff, and Githens, we are indebted for the most careful and exact researches, by the aid of the thermometer. All these observers have found the temperature somewhat raised, sometimes even very considerably; and our experience is confirmatory of these facts. In one instance only—a case of *meningite foudroyante*—which was brought to the hospital in a state of extreme collapse, when no pulse could he detected in any of the superficial arteries, did we find the temperature lowered; but, even in this instance, if we accept the history that was given by the patient's attendants, there was at first no inconsiderable elevation of temperature. The extreme irregularity of the thermometrical results has been particularly dwelt on by Hirsch and Ziemssen. Wunderlich and others also notice the extreme incongruity between the pulse-rate and temperature. Immediately preceding death the temperature has often been found very high, but observations of a contrary character also are wanting.

The heart's action and rhythm present no peculiarities, more than might be expected from a disease attended with such prostration. Pericarditis is so rare a complication that, by most writers, it is not mentioned. One case has been recorded by Tourdes, and another by Wunderlich, in which the affection was not diagnosed during life, and was only discovered during the autopsy. The following was an example of this accident of the disease which came under our notice; and, as far as we are aware, there has been observed but one other instance of it during the late epidemic.

Mary Francis, aged five years. On the evening of the fourth day from the commencement of her illness, the day upon which she was admitted into Sir Patrick Dun's Hospital, she was found complaining of great pain, which she referred to her forehead. Her cheeks were flushed her eyes bright and glassy with the pupils contracted, and she had much intolerance of light. Her tongue, which she readily protruded and promptly withdrew, was covered with a greyish-white pasty fur. She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suffered much from thirst, and continually called for water, which she swallowed greedily and with evident relish. Along with great restlessness, there seemed to be a morbid quickness of apprehension, watchfulness, and slight cutaneous hyperesthesia. The deep cervical muscles posteriorly were rigid, and the head was persistently retracted. The muscles of the extremities were relaxed. Some small spots, dark in colour, which did not disappear upon pressure, were observed on the legs, arms, and front of the chest. These, in some places, were raised, and, in other places, on a level with the surrounding skin. The respiration was very irregular, at one time fast, at another slow; it was panting, and interrupted by frequent sighing, having at times a catching spasmodic character. The pulse at the wrist was very hurried, small, and weak, though regular and equal; while the carotids throbbed, and the heart's impulse was strong and jerking. A loud and continuous bellows-murmur, accompanying, as well as could be ascertained, the first sound of the heart, was audible all over the precordial region; its point of maximum intensity was situated at the apex of the heart, and decreased gradually as it was traced upwards along the sternum. It could, however, be clearly heard at the left sterno-clavicular articulation. Upon the sixth day, slight *frottement* was heard at the base of the heart; and the suspicion of pericarditis, which in the course of a few days remained no longer doubtful, was seriously entertained. At no time during the course of this complication were there evidences of much accumulation of fluid within the pericardium; and the effusion throughout was believed to be chiefly, if not wholly, of a fibrinous nature. These signs disappeared in the course of a fortnight, leaving, it was supposed, the pericardium adherent. A double bellows-murmur, however, remained behind, and, many months after her dismissal from hospital, could be traced from the heart all along the aorta to its bifurcation. The question, which in this as in so many similar cases arises, as to the functional or organic nature of such a murmur, remains as yet unsolved. Some days subsequent to the discovery of the pericardial affection, slight facial paralysis on the left side was noticed, which subsided in the course of a few days, and did not afterwards reappear. The spots, too, about this time faded. The rigidity of the cervical muscles, however, continued for a period much more prolonged, and she became much emaciated. In fine, her convalescence was exceedingly protracted; nor did she quit the hospital till the end of the third month from the date of her admission.

Last, but not least among the physical signs, is the condition of the skin; paleness of the face, as also the peculiar flush upon the cheek, the bluish appearance of the extremities during collapse, and the varying state of dryness or moisture of the skin, merely deserve a passing notice. It is chiefly owing to the numerous forms of cutaneous eruptions, which have manifested themselves in many epidemics with such frequency as

even to have given their names to the disease itself, that the condition of the skin is deserving of special attention.

Among these eruptions, by far the most constant is that of herpes. In many European epidemics it has been particularly frequent, in 1840, even suggesting to De Renzi the idea of employing it to designate the disease. The lips and alæ nasi are the chief seat of this vesicular eruption; but it is frequently found upon the ears, eyelids, and cheeks. In rarer instances it has been even seen upon those portions of the scalp covered with hair, the neck, trunk, and extremities. Hirsch shows that it frequently diffuses itself over a large extent of surface, spreading from the lips upwards towards the eyelids and the forehead, or, as in another case, from the throat to the upper part of the arm. It usually appears within the first week, but sometimes not till a much later period. Some authors have regarded its occurrence as of good augury; but neither this nor a contrary opinion would seem to be warranted by facts.

Next to herpes, and not infrequently commingled with it, a peculiar petechial eruption, often of a singularly appalling character, has arrested the attention of all who have witnessed it. Like herpes, observed only in individual cases during the course of many epidemics of cerebro-spinal meningitis; in others, it is of such frequent occurrence that it has formed a no less characteristic sign of the malady than the vesicular eruption previously described, and has led, as well in the Old World as in the New, to many unhappy varieties of nomenclature. This petechial, purple, or dark-coloured eruption, which, during several epidemics in Europe and America, has manifested itself upon the surface of the body, and of the internal viscera, with more or less intensity, is so frequently wanting that it must be regarded as by no means a necessary phenomenon of the disease. Hence it is that all such names, and they are many,[a] as have from time to time been given to the disease, owing to the acccident of this eruption are unsuitable, as they only allude to a sign of the malady, which is anything but constant. Again the petechial eruption has been so frequently found associated with those phenomena which, as well during life as after death, characterize cerebro-spinal meningitis, that it cannot but be considered as merely an accident of this disease, dependent upon causes at present unknown. We cannot, therefore, regard it as diagnostic of a peculiar blood disease, distinct and wholly unconnected with cerebro-spinal meningitis. Among the cases, appended to this report, are to be found many in which the characters of this eruption are abundantly exemplified. We have observed these spots to become purulent and scab over in several cases, leaving, as in the case of Mary Hastings, permanent marks or pits

[a] "Spotted fever," "petechial fever," "morbo petechiale," "febris nigra," "black death," "malignant purpuric fever," "malignant purpura," "pestilential purpura," "purpuric fever," "neuro-purpuric fever," "typhus petechialis malignus novus," &c.

like small-pox. In some rare instances, observed by Stokes and Banks, the spots ran together and coalesced over some portions of the body, so as to cover a large extent of the skin, and render it as completely black as though it was wrapped in some dark shroud. In the instances to which we have made allusion, the entire right arm and half of the right side of the chest in the one case, and, in the other, the whole of the lower portion of one leg and foot, were thus affected. The late epidemic was as remarkable for the great frequency, as the previous epidemic of 1846, for the absence of petechial eruptions; and yet, there can be little doubt that both these epidemics were manifestations of the same disease. The sudden development and great extent of this eruption, with the profound collapse thereon attendant, as Gordon[a] has pointed out, are very appalling. Many, indeed the great proportion of such cases, ran a rapidly fatal course—a circumstance observed in other epidemics in which the petechial eruption appeared. Some few, however, like Mary Hastings, escaped after passing through extraordinary vicissitudes from which recovery was apparently hopeless, and lived to tell the tale of their sufferings.

A question has been lately propounded—are these cutaneous eruptions, herpetic and petechial, merely the results of the lesions of the nerve centres? Strange phenomena, no doubt have followed injuries of nerve-trunks, as exemplified in the records of Morehouse[b] and others, during the late American war, and in the writings of Hutchinson, Von Barensprung,[c] and others. Among these is specially to be noticed, the eruption of herpetic vesicles. Herpetic vesicles are the distinguishing character of the neuralgic affection known hence by the name of herpes zoster. Herpes labialis was also observed in a case of inflammation of the membranes of the brain and spinal cord, dependent on caries of the petrous portion of the temporal bone, recorded by Mannkopff.[d] Of the connexion, therefore, between herpetic eruptions and nervous lesions there seems to be little doubt. But, in the present state of our knowledge, it seems to be premature to regard the herpetic eruptions as altogether dependent upon the lesions of the nervous centres. The connexion between the petechial eruptions and the nervous lesions is anything but proved; and it remains yet to be determined whether that condition of the blood, whereby its transudation through the walls of the capillaries is favoured, is, in itself, a primary or a secondary manifestation in this disease.

[a] *Vide* Dub. Quart. Jour., May, 1867. The entire of Dr. Gordon's description of this eruption is particularly valuable.

[b] Report on Gunshot Injuries to Nerves, observed in the late American War, by Mitchell, Morehouse, and Keen. Philadelphia, 1864.

[c] Annalen der Charite Krankenhauses zür Berlin, ix. 2, p. 40.

[d] Uber Meningitis Cerebro-Spinalis Epidemica. Braunschweig, 1866. P. 213.

Besides these two great forms of eruption—the herpetic and the petechial—many others less frequently have been observed, either separately, or in conjunction with either of those which have been mentioned. Suffice it to notice the occurrence of carbuncles, pustules, and buboes, urticaria, sudamina, bullæ of various sizes, roseolous, rubeolous, scarlatinous, erythematous, erysipelatous, and ecthymatous eruptions. But, many and various as are these eruptions, it is to be remarked that, in a large number of cases of cerebro-spinal meningitis, none of them—even the herpetic—are present, and that therefore their presence cannot be considered necessary to the full development of the disease.

The condition of the joints is worthy of notice. Sometimes they become swollen, red, and tender; at other times red and painful, without any swelling; while, again, intense pain and rapid enlargement from effusion have occurred, unattended with any external redness. We have observed all these varieties in different cases. The joints which we have seen attacked were the knee, elbow, wrist, and the smaller articulations of the fingers and toes. In the case of W. H., the elbows, ankles, and some of the joints of the fingers and toes, were red and tender. In another case, that of Mary Hastings, the knee-joint, after a violent paroxysm of pain, became the seat of rapid and copious effusion, without redness or tenderness on pressure. In a third case, attended with a copious petechial eruption upon the chest and extremities, sudden effusion into the left knee-joint also took place, which did not wholly subside for more than a month. Similar testimony is borne by Gordon and other writers, both during the European and American epidemics. Hirsch, indeed, imagined that this condition had not been noticed before the date of his memoir in 1866; but even as long ago as 1810, it is alluded to by Welsh, Jackson, and Warren, in their report upon the spotted or petechial fever, then prevailing in the United States. In a case recorded by Rinecker and by Wunderlich, the affection of the joints preceded the meningitic symptoms by more than a day; and Mannkopff[a] states that some French physicians speak of an alternation of epidemic meningitis with an acute rheumatic affection of the joints.

The great and sudden debility which marks the onset of the disease is no less remarkable during its entire course. The strength of the patient, from the moment of the attack, seems completely prostrated; and, should death not soon follow, daily becoming weaker and weaker, he gradually wastes away till he reaches an extreme degree of emaciation. In this state he frequently succumbs; but, even if he should be spared so fatal an issue, he continues in a pitiable state of marasmus and debility, and his convalescence is often irregular, and extremely protracted, sometimes extending over months. Hirsch also calls attention to the fact, that numerous phenomena of a nervous character, such as long-

[a] Page 157.

continued headache, neuralgia, periodical attacks of convulsions, delirium, tetanic stiffness of the neck in moving it, morbid sensibility of some portions of the skin especially of the back, palpitations of the heart, &c., embarrass the return to health. Relapses, moreover, are not uncommon, and are often fatal.

Running a rapid course in a few hours on the one hand, on the other, extending over a period the most prolonged, and, between these extremes, exhibiting every possible degree of irregularity of duration, any limitation of the length of the malady seems hardly possible. In not a few instances during the recent epidemic in Dublin, as also during the previous epidemics in America, and on the Continent, the extreme rapidity of the disease has been most appalling. Such was the remarkable case detailed by Gordon, in which the entire duration of the disease was under five hours—possibly the shortest upon record. Another such case, given by Levy,[a] will bear comparison in the same respect, even with that of Gordon. The patient was suddenly attacked and was brought into hospital in a state of profound collapse. He died in an hour after his admission. Greenish lymph was found along the vessels on the upper surface and base of the brain, and in places along the cord.

As regards the number of those who suffered from the disease, and the proportion they bore to the sum total of the population, it is impossible to arrive at any definite results, owing to the very defective and evidently unreliable information which exists thereon. The same may be said of the rate of mortality in the various epidemics. Here, also, the statistics are not of such a kind as to enable us to form any certain conclusions. Probably Hirsch's view, that one-third of those attacked succumb, is, on the whole, the most correct opinion that can be formed in the present unsatisfactory state of our statistics.

Among the sequelæ which frequently attend the unfortunate sufferers even after recovery, for years, or even attend them during the remainder of their days, as incurable mementos of the malady, are deafness, complete and incurable in too many cases—as is to be feared in that of Mary Hastings—and, in little children, leading to deaf-dumbness; impairments of vision, owing to opacities of the cornea, closure of the pupil or posterior synechia, opacities of the lens, or of its capsule, opacities or softening of the vitreous body, detachment opacities or atrophy of the retina, degeneration of the choroid and posterior staphyloma, degeneration of the optic papilla, or even atrophy of the globe; paralysis of one or more limbs, or a general impairment of muscular power, seldom long persistent; chronic hydrocephalus; impairment of intelligence, rarely of weakness or loss of memory, complete imbecility, or even mania; and persistent pains in the head.

[a] Gazette Médicale de Paris. 1849, p. 830.

As regards prognosis, it may be stated generally that the greater the rapidity of development, and the greater the intensity of the symptoms and physical signs, the nearer the time of life of the patient to the extremes of infancy or old age, the earlier the stage of the malady, and the more profound the symptoms and signs of depression or of collapse, the more unfavourable is the augury. We cannot, however, too strongly bear our testimony to the excellence of Stillé's advice, that "it will be found imprudent too confidently to predict the issue of any grave case of the disease. Patients have recovered when all hope seemed forbidden, and others have died on the sudden accession of nervous symptoms, cerebral or spinal, when the hour of danger seemed to have passed away."

Of a disease comprehending so varied an assemblage of symptoms and physical signs, the morbid lesions revealed after death are sufficiently characteristic.

The body is frequently found emaciated in a degree proportionate to the duration of the illness—sometimes to a very notable degree—as happens in other diseases characterized by great exhaustion and marasmus. This extreme emaciation would appear, from the researches of Klebs, to be due to atrophy of the muscular fibres, as well as of the interstitial connective tissue. He has also detected with the microscope, a granular deposit between the muscular fibres. Cadaveric rigidity is generally well-marked and long-continued. In Burdon-Sanderson's cases there was no rigidity of any of the muscles which had been contracted during life; but this is not always so, as in the case of Dooley, the muscles of the neck, which were affected during life, were rigidly contracted after death; purple discoloration and hypostatic congestion of the dependent parts takes place rapidly after death; while in some rare cases, the whole body, even before death, has become rapidly black, and a sickly odour, as of incipient putrefaction, has been evolved. While the dependent portions of the body become discoloured, the anterior become pale, and the petechiæ, if any have existed during life, frequently are changed to a lighter or a redder hue. On the contrary, however, in other rare cases, so rapid is the process of dissolution, that soon after death large patches of ecchymosis become diffused over the surface of the body, blood pours from the mouth, and the body swells to such an extent as to be recognized with difficulty. Ecchymoses have also been observed on the internal viscera, as in the case of W. H. Indeed, the rapidity with which putrefaction usually ensues is remarkable.

On removing the calvarium, almost all writers, save Mayne, have found very marked indications of hyperemia in the diplöe and dura mater. The vessels bleed very freely, and the internal surface of the membrane is often highly polished and intensely injected. The sinuses

are seen to be turgid, filled with dark coagula, and sometimes even with firm fibrinous masses; and unusually large Pacchionian bodies, sometimes softened and purulent, have been met with projecting through the dura mater, near the superior longitudinal sinus. Many[a] have noticed the dry, opaque, lustreless, and clammy state of the arachnoid membrane; while, on the contrary, others[b] of no less eminence have found this membrane often perfectly normal. A like difference is observable in the condition of the cavity of the arachnoid sac: during one[c] epidemic ordinarily containing a small amount of serum and only occasionally dry, or marked by flakes of lymph, during another[d] this cavity is stated to have contained no lymph or other inflammatory products. During the recent epidemic in Dublin the same differences, in the absence or presence of fluid or of opacities within or upon the arachnoid membrance, were noticed. A fine arborescent injection of the cerebral arachnoid is spoken of by Burdon-Sanderson. But, though these lesions of the arachnoid and dura mater are not uncommon, the changes which are found underlying the serous tunic in the meshes of the pia mater are much more constant and characteristic. In this respect the observations of all who have studied the *post mortem* appearances since the commencement of the present century are sufficiently uniform. Pus, or lymph, of varying degrees of consistence, colour, and quantity, has been found beneath the arachnoid, disposed as streaks along the vessels occupying the inter-gyral subarachnoid spaces, or more abundantly forming patches of various extent, superficial or penetrating, between the convolutions, on the surface of the brain and cerebellum. The exudation sometimes existed equally on the upper and under surfaces of the encephalon; but its chief seats were the base of the brain, the anterior, middle, and superior subarachnoid spaces, and the superior surface of the cerebellum. The vessels of the pia mater itself are almost invariably found intensely injected, so as to give to the membrane a bright rose tint. Patches of capillary congestion and extravasations of blood are also usually met with scattered over the surfaces of the hemispheres and cerebellum. In some cases[e] the pia mater could be readily stripped off from the surface of the brain without the removal of any fragments of the grey matter; whereas in others[f] the very opposite occurred. The ventricles also are often the seat of effusions of varying quantity and quality—serous, purulent, sero-purulent, or sanguineous.[g] Klebs gives a remarkable case

[a] Mayne, Liddell, Hutchinson, Clarke, &c.
[b] Tourdes, Forget, Chauffard, Lindström, Wunderlich, &c.
[c] Tourdes, Danielson and Mann, De Renzi, &c.
[d] Mayne, Burdon-Sanderson, &c.
[e] Burdon-Sanderson.
[f] Hirsch.
[g] E. D. Mapother, Brit. Med. Jour., May 30, 1868, p. 533.

in which the lateral and fourth ventricles, and their channel of intercommunication, were fully distended with thick yellow pus.

Respecting the lesions of the membranes which invest the spinal marrow, evidence cannot be adduced dating so far back as that concerning the membranes of the brain, owing to their not having been habitually examined. The appearances observed within the spinal canal are, however, altogether similar to those already described as occurring within the cavity of the cranium. The theca vertebralis exhibits marked hyperemia. On dividing it the vessels of the visceral arachnoid are found swollen with blood, and the whole membrane minutely injected. As in the case of the cerebral, so in that of the spinal serous tunic, its sac may,[a] or may not,[b] be the seat of a serous, fibrinous, or purulent effusion. An exudation in all respects similar to that met with in the meshes of the cranial pia mater, and equally varying in quantity, quality, and in extent, is found in the subarachnoid spaces, often completely enveloping the cord. Unequally diffused in general, and collected in larger quantities in some places than in others, it is usually particularly abundant upon the posterior aspect of the spinal marrow, possibly, as Klebs suggests, owing to the influence of gravity. In a case recorded by Hirsch, the central canal of the cord was distended with pus.

Microscopical examination of the exudation, in the cases which are appended, showed that it consisted of granular *debris*, imbedded in which were numerous small granular cells, chiefly circular in form, measuring about $\frac{1}{4000}$ of an inch in diameter, very similar in character to pus corpuscles, save that they were much smaller in size. Burdon-Sanderson's observations are to the same effect. Klebs also justly remarks that very often pus exists where it is not visible to the naked eye, and where, in order to recognize it, even with the aid of the microscope, the observer should be familiar with its transition forms.

Mayne long ago drew attention to the fact that the nervous matter seldom suffered, and when involved was only so accidentally owing to the propagation of the disease from its membranous investments. We can fully bear out this testimony in the cases we have observed both as regards the brain and spinal marrow. The cords we have examined with care, but in only one of them could we find any evidence of disintegration under the microscrope. Specimens, however, have been submitted to the Pathological Society of Dublin by Drs. B. M'Dowel and Hayden, in which the marks of localized softenings of the spinal cord were present. Other writers[c] also record cases in which portions of the spinal marrow were found in a state of complete disintegration. It

[a] Klebs, Stillé, Clarke, &c.

[b] Mayne, Burdon-Sanderson, &c.

[c] Ames, Chauffard, in Revue Med., 1842, Mai, p. 190.

must be admitted, however, that such cases are rare. Softening of the substance of the encephalon, though also uncommon, appears to be more frequent than the corresponding condition of the cord. Allusion is here only made to cases of white softening; but Klebs, on two or three occasions, in rapid cases of cerebro-spinal meningitis, has found foci of softenings varying in shade from straw-colour to red in the centrum ovale, and in each of these cases he has found indications of recent endocarditis.

A question here presents itself as to the relation between the cerebro-spinal lesions and the duration of the attack before death. Chauffard has entered on this inquiry with considerable minuteness; but his statements are much too exact to be generally applicable. The frequency of softening of the nervous matter in his cases, too, is remarkable, and seems to bear little comparison with the experience of other observers. In the exceedingly rapid cases of *meningite foudroyante* we would merely remark that, though very frequently the only appreciable changes to be found are congestions of the cerebral and spinal pia mater, and though the influence of the duration of the disease in determining differences in the appearance and in the amount of the exudation cannot be doubted, in other cases, as will be presently noticed, the exudation, either as regards its quantity or its quality, seemed to bear a proportion not to the duration of the disease, but to the violence of the inflammatory processes.

Much needless stress, in our judgment, has been laid by some writers upon the hyperinotic condition of the blood during life in this disease. After death, in many cases, the blood has been found dark, and either liquid or containing only soft clots. Fibrinous coagula frequently occupied the heart and great vessels. A shrivelled or crenated appearance of the blood-discs, and an irregular distribution of these bodies in the field of the microscope has also been observed.

As regards the condition of the other organs of the body after death, a brief notice will be sufficient. They present a variety of lesions dependent upon the patient's previous health, local causes, and upon the complications which may arise in the course of the disease, but none which essentially belong to its pathological anatomy.

The lungs are generally hyperemic and hypostatically congested; the bronchial membrane reddened and sometimes covered with a viscid secretion. Evidences of pneumonia, too, are sometimes to be found, as well as of œdema and pulmonary apoplexy. Tourdes, Corbin, Lindström, Merkel, Bohmer, and Ziemssen, have, in rare instances, found the pleural cavities containing a fibrinous, serous, or even purulent exudation. The pericardium is sometimes seen studded with small ecchymoses, and in its cavity, as in that of the pleura, inflammatory effusions, the result of a pericarditis sometimes not even until then

suspected, have been discovered. The heart usually appears normal. In its muscular tissue the same changes have been recognized by Klebs as in the other muscles to which allusion has been previously made. The same observer and others[a] have also occasionally noticed marks of recent endocarditis. The gastro-intestinal mucous membrane has sometimes been found reddened or slightly ecchymosed. Tumefaction, with or without ulceration of the solitary and agminate glands, has been met with, but never the peculiar infiltration and ulceration of typhoid fever. Concerning the other abdominal viscera little need be said. The liver, the kidneys, and particularly the spleen, have exhibited varying degrees of congestion and the results of previous disease in individual cases. In the joints which had been affected during life, or in the neighbouring areolar tissue, we, as well as many others,[b] have seen lymph, pus, or other inflammatory products. The lesions of the organs of sight and hearing have been already sufficiently described.

From these brief details it must be evident that the examination of the body after death has generally, wherever it has been made, afforded very constant and characteristic lesions—namely, those indicative of extensive inflammation of the cerebro-spinal meninges. Of these membranes the pia mater and the arachnoid, especially the former, are the chief seat of the local changes; for, well nigh all observers agree that the peculiar characteristic of the disease consists in an inflammatory condition of the pia mater, the vascular tunic covering alike the brain and spinal marrow. Congestions; plastic, purulent, sero-purulent, or serous exudations; sometimes even alterations of the nervous substance itself, of ever-varying extent, singly or together, bear their testimony to the nature of these inflammatory processes. But these inflammatory changes, constant though they be, are not the only, nor are they always the most important features of the disease. Behind them all, as in other affections, modifying and at times predominating, lies another, a constitutional, element, which gives to the disease so many of its varied and most appalling characters. This constitutional element, the importance of which cannot be over-estimated, is remarkably exemplified in those malignant and rapidly-fatal cases of *meningite foudroyante* so called, which occurred within the past two years throughout this island. The lesions here found, in many instances, have been only varying degrees of congestion of the pia mater, and similar experience is not wanting from the records of other epidemics, so that some French writers have even given to this form of the malady the title of *forme congestionelle*. On the other hand, however, it must not be forgotten that, even within so short a space of time as five hours from the occurrence of the first symptoms which ushered in the fatal attack, the products of inflammation have been found

[a] Vide the case of Mary Francis.

[b] Levy, Wunderlich, Klebs, Corbin, Hirsch, &c.

by Gordon beneath the arachnoid membrane, and that, too, without any of the special symptoms of cerebro-spinal meningitis during the brief period of the illness save intense pain in the head and vomiting. Levy's case, which has been already alluded to, is no less remarkable as regards the shortness of its duration and the extensive exudation which existed upon the brain and spinal cord. In one of the cases appended similar changes were noticed thirty hours after seizure. From these and other equally decisive cases, characterized, too, by petechial eruptions, which might be adduced in corroboration, it can be proved that, early as death sometimes occurs, it is not too early for the manifestation of undoubted evidences of inflammation of the membranes of the brain and spinal marrow. From this it follows that a more or less prolonged period of duration is not always necessary for the development of the characteristic signs, *post mortem*, of cerebro-spinal meningitis; and it would appear that, when the products of inflammation are to be found developed within so short a period of time as has been recorded, the inflammation itself, from which they spring, cannot be considered otherwise than primary and as constituting, along with the constitutional element, the pathological essence of the disease.

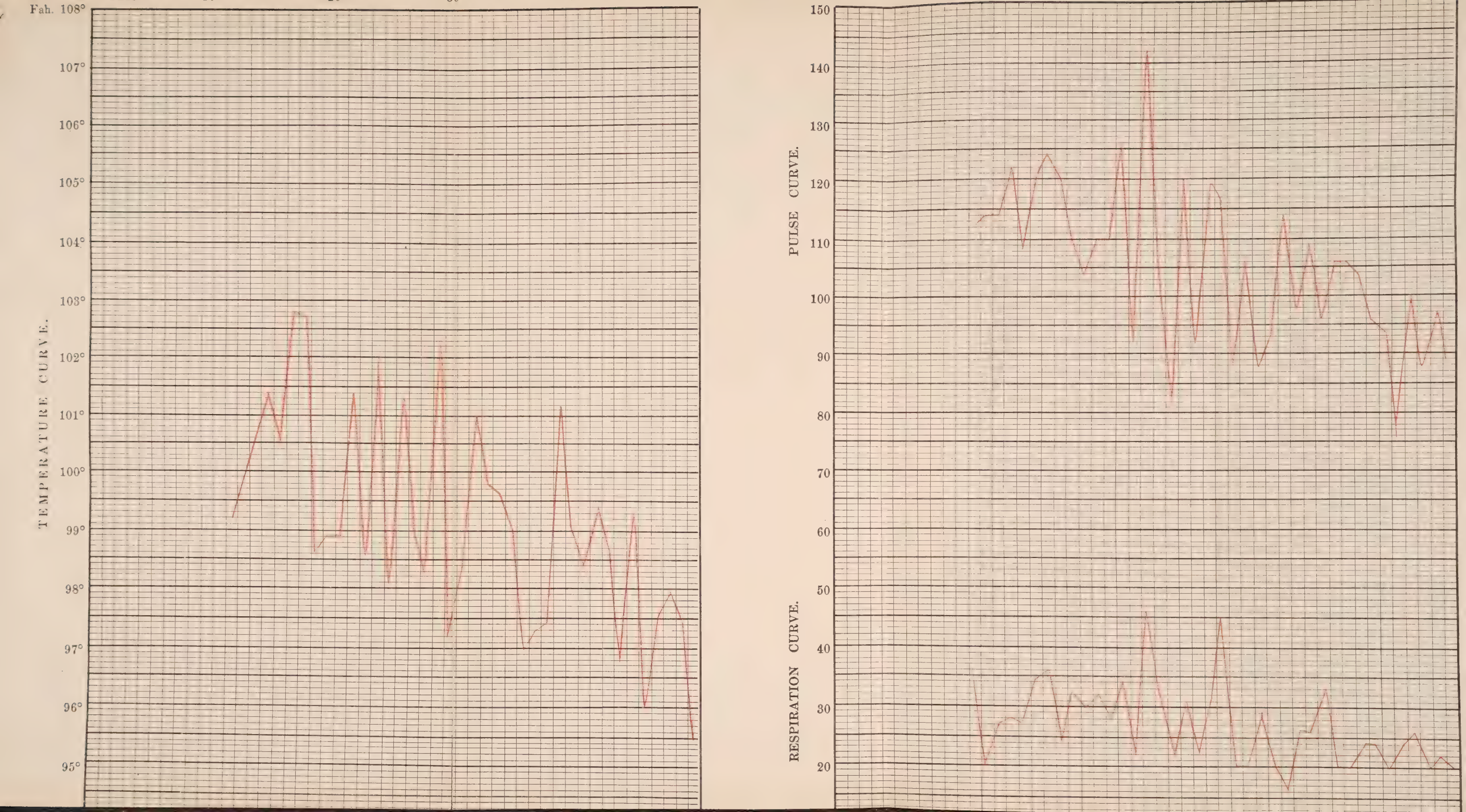
The diagnosis of cerebro-spinal meningitis is usually attended with little difficulty, especially if at the same time the disease be epidemic. Not a few cases, however, on the other hand, occasionally present themselves, in which the recognition of the malady offers one of the most difficult problems to the physician. Yet such cases, it is almost universally admitted, are rare, and constitute a very small proportion of the whole. In by far the larger number, the onset, course, and termination of the disease are so characteristic that they leave little to be desired to recognize its distinctive features. The phenomena of the malady have been entered into at such length already that a brief recapitulation of only the most important, for the purpose of differential diagnosis, seems here to be required. Suffice it to notice the peculiar vomiting; the violent pains in the head, neck, spine, and limbs; the stiffness and contraction of the neck and back; the trismus; the tetanic expression of countenance; the cutaneous hyperesthesia; delirium, alternating with coma or with lucid intervals, and subsequently merging into profound insensibility; tonic and less frequently clonic spasms; paralyses of various forms and degrees, especially those dependent on lesions of the second, third, sixth, and seventh nerves; the affections of the special senses, particularly those of sight, hearing, and common sensibility; the shifting character of the pulse, temperature, and markedly of the respiration; the variety and form of the eruptions; the singular and often extreme prostration, bearing no portion to the duration or even to the intensity of the sufferings; and, in too many instances, the appalling rapidity of the fatal issue.

After the lapse of many years it cannot be affirmed that the darkness in which the etiology has been shrouded is in anywise dispelled. The influence of the season of the year, weather, climate, locality, hygienic condition, sex, age, occupation, fatigue, debility, grief, excesses, overcrowding, insufficient ventilation and sewerage, diet,[a] and even intestinal worms, have each and all at different periods been appealed to as capable of explaining the occurrence of the disease. A detailed inquiry into each of these alleged causes would needlessly prolong this report. We must content ourselves, therefore, with stating that they all alike offer to us no satisfactory solution of this most difficult question.

The consideration of the communicability or non-communicability of this, as of some other diseases, is perhaps one of the most difficult problems in pathology. And the fact of the unsettled state of this question, even at the present day, as regards cholera, is not calculated to encourage us to adopt positively any one opinion. Facts have been advanced by Hirsch, Stokes, and particularly by Boudin, which, taken alone, would go far towards determining the communicability of the disease. On the other side, however, we are met by the almost universal experience of the profession that no such communicability could be ascertained to have occurred, even under those conditions most favourable for its development. This problem thus remains unsettled. We may merely remark that we have not seen any case in which there was reason to believe that the disease was acquired by communication or was communicated to others.

As regards the relation of expizootics and epidemics of cerebro-spinal meningitis, we have the authority of Mr. H. Ferguson, the well-known Veterinary Officer to the Privy Council in Ireland, for stating that, on each occasion when an epidemic of cerebro-spinal meningitis has appeared in this country, it has been preceded by, and co-existed with, an epizootic of the same nature among the lower animals, especially pigs and dogs. In the disease called purples among the former—so called by reason of the cutaneous eruption which, though at first red, soon becomes purple—there have been found, on *post mortem* examination, evidences of cerebro-spinal meningitis, besides extravasations of blood into and upon the muscles and viscera, and within the cerebro-spinal cavity. In the pig this malady is almost always accompanied by the characteristic purple eruption. Other varieties of it have been popularly termed "black leg," "joint fever," &c.; and the same disease, unattended by the cutaneous eruption, has been observed in horses, oxen, &c. Splenic apoplexy of oxen and sheep, which in France has been connected with

[a] It is a curious circumstance, in connexion with the question of diet, that ergot has been lately used in America (Boston Med. and Surg. Journ., July 18, 1867,) as a remedial agent in this disease, of which it was, without proper foundation, suggested by Dr. B. W. Richardson (Social Science Review, May, 1865, p. 403,) to be a cause.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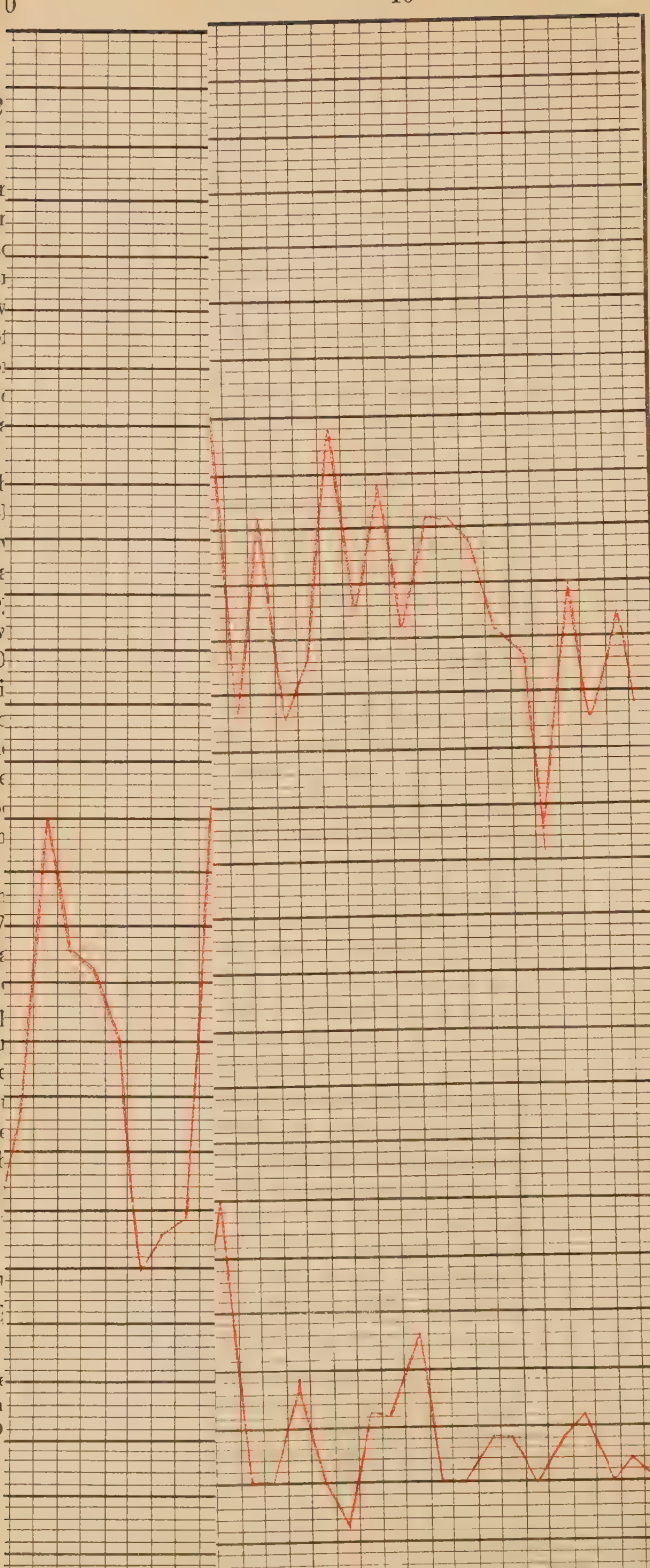

the entrance into the blood from the air of the bacteria, presents somewhat similar phenomena. Healthy animals inoculated with blood taken from animals labouring under splenic apoplexy become similarly affected, and it has been stated by E. Crisp[a] before the Epidemiological Society of London, at their meeting in July, 1867, that if the flesh of animals thus affected be given to pigs they become the subjects of cerebro-spinal meningitis.

The preceding and following illustrative cases which we observed as resident in Sir P. Dun's and at the Meath Hospitals, are inserted by the kind permission of the Physicians of those hospitals :—

John Dooley, aged 10. On the day upon which he fell sick he was found by his aunt in the afternoon vomiting and complaining of pain in his head. Shortly before midnight he again vomited, the ejecta, on each occasion, being, according to the statement of his mother, "as green as the grass." The vomiting continued during the next day, so that nothing that he partook of remained upon his stomach. In the course of the morning, at 9 a.m., furious delirium set in. He commenced roaring so loud that his cries could be distinctly heard in the street. He complained of severe pains in his head, in the back of his neck, along his spine, in his right knee, and in his belly, and of general soreness when touched. In the afternoon, at 3 p.m., purple spots made their appearance upon the upper and lower extremities. They were of various irregular shapes—some very large, some very small, some raised above the skin, others again upon a level with it. In the course of four days, having filled up with purulent matter, they scabbed over and faded away. The screaming and other symptoms continued with very slight periods of intermission during the succeding week ; and he kept continually grinding his teeth. His consciousness, however, remained unimpaired. On the twelfth day from the commencement of his illness he was admitted into Sir P. Dun's Hospital. When visited he lay upon his left side with his head far retracted, his face flushed and bearing a semitetanic expression ; and nothing would induce him to alter his position, as the slightest movement caused him exquisite pain. His tongue, which at first had been covered with a bright green coating, was now covered with a thick pasty yellowish-white fur ; it was red and moist at the edges. He complained of pain in the back of his head and neck, but there was no tenderness upon pressure. His lips and gums bore traces of the continued grinding of his teeth.

The daily records of the case from this time present nothing particularly worthy of notice, save the fact that the disease assumed a very irregular remittent type, very well-marked periods of exacerbation and

[a] Vide Lancet, July, 1867.

remission of the symptoms and physical signs, succeeding each other at longer or shorter intervals. During the periods of remission the patient was cheerful, free from pain, and moved about freely in bed. On the other hand, during every exacerbation he was peevish and fretful, easily annoyed, and racked with pains in his head and neck. His face, too, at these times was generally flushed and wore a curious tetanic aspect. The retraction of his head subsided about a week after his admission, and was succeeded by rigidity of the neck. The cutaneous hyperesthesia was very remarkable, reaching not unfrequently such a height that if touched he immediately cried out and begged his tormentor to desist. Attacks of vomiting very often ushered in or attended the periods of exascerbation so that there were times when nutrient enemata were the only means left of supplying him with nourishment. Thus, reduced to little better than a skeleton, he lingered on till the sixty-sixth day of his illness, when he was seized with vomiting and convulsions, and shortly after died.

The autopsy was made 18 hours after death. The body was very much emaciated, and the head rigidly retracted. The dura mater was adherent to the calvarium, so that it had to be removed with it. Underneath it the arachnoid membrane, both on its parietal and visceral aspect, was preternaturally dry, and where it bridged over the subarachnoid spaces, was thickened and opaque; and lymph was deposited in considerable quantity at the base of the encephalon, in the anterior and posterior subarachnoid spaces, so as to cause complete occlusion of the cerebro-spinal opening, and along the course of the cerebral nerves. There was no remarkable congestion of the vessels of the pia mater. The sulci, between the convolutions, were almost hidden, and the convolutions themselves greatly flattened, owing to the intraventricular pressure. On section of the hemispheres the lining membrane of the ventricles was found thickened; the ventricles themselves—the lateral, the third, and the fourth—distended with fluid, and their channels of intercommunication—the foramen of Monro, and the aqueduct of Silvius—increased in size and thickness. This great collection of fluid in the ventricles, which was apparently due to the occlusion of the cerebro-spinal opening, seems to have been the immediate cause of death.[a]

In the upper cervical region a considerable quantity of dark venous blood escaped from the structures when divided. Greenish lymph was found deposited in flakes all along the posterior aspect of the cord. No evidences of disorganization of the nervous substance could be detected. The cord was preserved, and subjected to a process of hardening. We subsequently examined it microscopically, but no lesions of its substance were discovered.

[a] Vide Hilton's Lectures on Rest and Pain, p. 33.

W. H., aged 22. This gentleman's illness, which unhappily was destined to prove so deeply interesting, was ushered in at 11 p.m., by a stiffness in his neck which caused all movements of his head to be attended with considerable pain. He thereupon retired to bed; but was attacked at 3 a.m., having passed a very restless time meanwhile, with vomiting and violent diarrhea. He felt at the same time very hot and thirsty, and complained of a feeling of suffocation, which he attributed to a great collection of mucus in his throat. The purging and vomiting soon ceased. Throughout that day he continued to complain of difficulty of swallowing, transient headache, great pain in his thighs and legs, aggravated by the slightest pressure, and slight pain in the back. In the course of the evening it was deemed advisable to remove him from his residence to a private ward in Sir P. Dun's Hospital. He was then quite conscious, and conversed rationally with those around him. His upper and his lower extremities, especially the latter, were covered with large ecchymotic spots, which evidently consisted of blood extravasations into the true substance of the skin, as they were not raised and did not fade on pressure. These spots, though indistinctly seen during the morning, had first become clearly defined at 4 p.m., according to Dr. H. Kennedy, his medical attendant, who had closely watched the progress of their development. The stiffness of his neck still continued, unattended, however, with any retraction of the head. His legs were exceedingly painful, seeming to possess a morbid sensibility, and his fauces were of a deep-red colour. At 4 the following morning he began to complain of severe pain shooting round from the spine through the hypochondria and epigastrium. Owing to this pain his breathing was very hurried and laboured. At 9 a.m., he was still conscious, complained of the stiffness of his neck, and answered questions addressed to him; but, his manner was more stupid. His temperature and pulse had fallen considerably. Shortly afterwards a bluish-yellow tinge overspread his features; he suddenly became unconscious, and at the same time very restless and excited. This temporary excitement, however, soon passed off, and he lapsed into a state of coma. About 4 p.m. he showed signs of renewed consciousness, spoke a few words, and swallowed some beef-tea, holding the cup from which he drank it himself. Four hours later he again became very restless, crying peevishly, and desiring to get out of bed. He spent a very restless and sleepless night. In the morning (3rd day) he fell into a doze for about an hour and several very dark stools passed from him. The catheter was introduced, and a small quantity of highly coloured urine, containing blood, was withdrawn. The introduction of the instrument, though effected with all gentleness, gave him considerable pain. It was, therefore, surmised that the blood might have come from the urethra. The spots on the legs were of a brighter colour. Apparently unconscious, with his eyelids closed, he kept constantly

muttering over some Greek sentence, which was unintelligible—the burthen of it being, '*ὦ κακά κακά.*' And yet there were times when he seemed to possess a slight amount of consciousness, and answered questions put to him; but, he immediately relapsed into his former state. He again passed a very restless night, rambling much. The following morning (4th day) he seemed quite conscious. His tongue was moist, and covered with a brownish-white fur. The spots were still brighter in colour. His pulse was full and strong, and he only complained of slight pain in his head and throat. A blush of redness, which had been first noticed the previous day, upon the knuckle of the right middle finger still continued, and a similar blush made its appearance upon the lower part of the thumb. Throughout the day he continued conscious, but raved a good deal. In the evening he again became very restless. The next morning (5th day) he was quite conscious, and answered questions rationally, imagining that he was in his accustomed place of residence. The lips and angles of his mouth in many places were covered with herpetic vesicles. The erythematous blush over the joints had not faded. Other large patches of a similar character had made their appearance on both elbows, especially the right; and a few such spots were observed on the ankles. On the seventh day purulent herpetic vesicles were found at the alæ nasi. He had passed an uneasy night. The spots had much faded and showed a tendency to scab. The erythematous patches were also paler in colour; but a few fresh patches had appeared on the toes. He was quite conscious and seldom rambled. During the next day this apparent amendment continued. He only complained of slight pain in his head; and so much better did he seem that his friends were most anxious that he should be pronounced out of danger. The urine this day was examined microscopically, and the deposit, which was exceedingly copious, was found to consist wholly of pus. The sanguine hopes which were entertained of his recovery were not destined to be realized, for, on the following morning, the ninth and last day of his illness, at 4 a.m., partial right hemiplegia set in, with increased stiffness of his neck, and at 9 a.m., he suddenly died.

An examination of the cerebro-spinal centres alone could be obtained It was performed twenty-eight hours after death. An unusually large amount of blood issued from the scalp. On removing the calvarium, the Pacchionian depressions were found to be very large, and corresponded with a vast mass of Pacchionian bodies underneath, which were firmly adherent to the dura mater. These aggregations of Pacchionian bodies were so hard in some places as to communicate to the finger the feel of bone. They were symmetrically deposited on each side of the superior longitudinal sinus. The large veins which ran towards the sinus at this point were remarkable for their size and intense vascularity; and, on the right side, at the point of junction of the largest of these veins

with the sinus, a large coagulum was found completely occluding the vein. The dura and the pia mater, cerebral and spinal, were intensely congested. The numerous patches of capillary congestion of the pia mater, covering the anterior lobe of the right side, gave to it an unusually red colour. The surface of the arachnoid had a dry and greasy feel, and it was adherent to the anterior clinoid processes. In some places it was opaque, and greenish lymph was deposited beneath it in very considerable quantity. This, in some parts, seemed to have been deposited for some time, in others more recently. The situations in which it was more particularly abundant, were at the base of the brain in the circle of Willis, completely surrounding the optic commissure; on the pons Varolii and medulla oblongata; on the superior surface of the cerebellum, in the fissure of Bichât, more especially on the left side; in the velum interpositum; and along the posterior aspect of the spinal marrow, increasing towards the cauda equina. The cerebral convolutions were considerably flattened, and the vessels occupying the sulci were gorged with dark blood. A very large quantity of blood, mixed with matter resembling pus, issued from the internal carotid vessels when they were cut, especially from that on the right side. The puncta cruenta, on section of the brain cerebellum and spinal cord, and the parts composing the floors of the lateral ventricle, all, by their great vascularity, bore evidence of the intense congestion. The lateral ventricles, as also the fourth, and the spinal subarachnoid spaces were filled with a semipurulent fluid, the pressure exercised by which seemed to have been the immediate cause of death; and the parts composing the lateral ventricles, as well as the substance of the cord, in many places, were in a state of complete disintegration. No pus could be found in the affected joints, but a quantity of pus, or greenish lymph, was found in the areolar tissue surrounding the joints.

Mary Anne Walshe, aged eighteen. Previous to the date of her illness, this girl had habitually complained of headaches, and, in the opinion of her relatives, had been a little foolish. She was attacked with retching, and she twice vomited a fluid resembling water, complaining at the same time of pains in her right side and head. That night she became delirious, frequently screaming out for some one "to help her side and head." During the following morning she became quite stupid, and remained in that state till she was admitted into Sir P. Dun's Hospital. On the evening of the fourth day, the day on which she was admitted, she was insensible. Her head was far retracted, and the deep cervical muscles rigid. The heart's action and the pulse, as also the respiration, were regular but laboured. The throbbing of the carotids was remarkable. No eruption could be detected, save a few vesicles of a red colour on the right hand and knee. Of those on the knee, one or two contained a small quantity of pus. The right pupil was more contracted than

its fellow on the opposite side. The tongue was loaded with sordes. She could not be got to swallow anything. Her urine escaped involuntarily. She continued in this state during the following day. On the sixth, loud bronchial rales were audible over the chest, her pulse and respiration had risen to an exceedingly high rate, and she bore a much more dusky aspect. She opened and shut her eyes frequently, and followed with her eyes those engaged around her, without uttering a word, still continuing in the same heavy, lethargic state, with her head retracted, swallowing with difficulty, and passing everything under her. On the following morning (7th day), she was found with her eyes open, looking about her; and, to the astonishment of those around her, she was able to answer questions. She complained merely of pain in her head and neck. Both pupils were normal. Sordes covered her lips and gums. The pulse was rapid, small, and feeble; the heart's action weak and hurried. She died the same evening apparently from exhaustion.

The autopsy was performed sixteen hours after death. The dura mater was normal; the arachnoid slightly moist and free from any deposit. The pia mater, however, was intensely injected, so as to present a bright red appearance. Small collections of green lymph were found scattered here and there upon the surface of the posterior lobes, anteriorly along the distribution of the fissure of Silvius on both sides, and in the middle subarachnoid space, between the oculomotor and trochleator nerves. It was, however, deposited in greatest abundance upon the superior vermiform process of the cerebellum, under the great fissure of Bichât. A small amount of turbid serum was found in the lateral ventricles. The theca vertebralis was normal. Anteriorly the cord appeared quite healthy, save that the spinal vessels were very full of blood, especially towards the cauda equina. The posterior vessels were much more congested than the anterior, and were in some places exceedingly tortuous. The pericardium was preternaturally dry, resembling parchment.

Anne Doyle, aged eighteen. This girl's illness commenced by a feeling of weakness while she was at her devotions in chapel. She came home half an hour afterwards and fell upon her knees to perform her usual duties before going to bed. Her aunt, noticing that she remained a longer time than usual on her knees, and thinking that she had fallen asleep, called to her. She then commenced to sob and cry—a circumstance very unusual—and went to bed complaining of not being well. She remained quiet till midnight, when she started up in bed and vomited some fluid of a bright green colour. Subsequently she vomited twice or thrice, but only threw off fluid resembling water. Severe purging then set in, with great thirst and intense heat of skin. She also complained of great pain in her head and of sore throat. She

answered questions rationally, but immediately afterwards her mind seemed to wander. The next morning she complained that her right arm was sore and would not allow it to be touched, nor did she herself use it. This passed away about four p.m. When visited in the course of the afternoon by Dr. Chapman her face, body, and extremities had large, very dark, and, in some places, black spots of irregular shape scattered over them. They were neither raised above the surface, nor did they fade upon pressure (nor did they disappear after death). They varied in size, in some places being exceedingly small, in others fully as large as a sixpenny piece. They had no definite shape, and their margins were exceedingly irregular. These spots had not been noticed by her friends till they were pointed out to them by Dr. Chapman, though they had no doubt appeared before that time. Shortly afterwards she ceased to reply to questions addressed to her. When brought to Sir P. Dun's Hospital at 11.30 p.m. she was in a state of profound collapse. No pulse could be found in any part of her body. Her extremities, as also her face, were deadly cold and blue. The temperature taken in the axilla was 93°.3 Fah. She was covered with the eruption already described. Her eyes were fixed and staring; the pupils equal, widely dilated, and insensible to the stimulus of light. Her breathing was laboured, numbering fifty-two respirations in the minute; her heart's action rapid and very feeble. She had no retraction or stiffness of her neck. She lay upon her back, speechless, unconscious, with her eyes open, fixed, staring, and meaningless. In this condition she remained, moaning at intervals, tossing her arms wildly about, grasping at imaginary objects in the air, and picking at the bed-clothes, till she died at 3·30 a.m., four hours after her admission and thirty hours after seizure.

The autopsy was performed 8½ hours after death. The dura mater was exceedingly red, and was almost universally adherent to the calvarium in the mesian line, especially at the vertex and posteriorly. Lymph was deposited in many places beneath the arachnoid, between it and the pia mater. The latter membrane itself was intensely injected everywhere. Numerous puncta cruenta, from which blood oozed, appeared on section of the cerebrum and cerebellum. In the lateral ventricles there was some bloody serum. The choroid plexuses and velum interpositum were very vascular. The venæ Galeni were very large and filled with blood. Several veins were seen ramifying on the corpora striata; and the right corpus striatum exhibited a large vascular patch, into which several veins ran from the choroid plexus. A small cyst lay in the anterior portion of the choroid plexus on the left side. The dura and pia mater were intensely congested at the upper part of the cord, and all the nerves constituting the cauda equina were covered with a network of red vessels. A quantity of serous fluid flowed from the subarachnoid space. The spinal vessels were tortuous and very vascular.

Greenish lymph was found deposited all along the posterior aspect of the cord, more particularly at its lower region. Section of the cord showed numerous bleeding points. The medulla spinalis was hardened and examined microscopically, but no lesion could be detected. The intestines were found studded here and there with ecchymoses in every respect similar to those observed on the skin; and like spots were observed on the heart—one upon the anterior surface of the right ventricle lying on a mass of fat, many on the posterior surface of the left ventricle. The lungs were intensely congested. The uterus was full of bloody debris.

Thomas Devine, aged eleven, Tallaght. This boy had suffered from severe headaches for some time previous to his present illness. On Tuesday, April 28th, 1868, however, after coming in, he sat down without saying anything. For some time he made no reply to questions addressed to him. At last he stated that while out he had been frightened by the appearance of a black man "so tall that he could not see the top of his head," that this man had in some way menaced him; and that, in consequence, he had run home. Shortly after this he went to bed, and soon began to complain of intense pain in his head, particularly in the region of his forehead. So great was this pain that he continued to cry out "Oh my head." On the following morning he vomited a small quantity of a yellowish fluid. His skin felt hot, and he perspired freely. Suffice it to say that the pain in his head grew more and more intense, so that day and night he continued screaming out by reason of it. A few days subsequently he began to complain of pain in his neck and back; and his head became slightly retracted. He roared when touched or moved. He raved more or less; and his bowels remained constipated till after the administration of Ol. Ricini on the eleventh day, when the constipation was succeeded by purging.

He was removed to the Meath Hospital on the fourteenth day of his illness. He was then in a semi-conscious state, lying with his eyes half closed. When sharply and loudly addressed, he dreamily answered without opening his eyes. His head, as he lay was slightly retracted; but, when he was raised, it could be brought forward so as to be on a line with the rest of the spine. This, however, evidently caused him pain. His neck was rigid and could not well be moved from side to side. He passed his urine and feces involuntarily. There was considerable muscular, but apparently no cutaneous, hyperesthesia. His pulse was full and regular; and the respiratory and cardiac sounds were normal. Some minute indelible spots appeared on the chest. He complained of pain in his forehead. There was slight conjunctivitis, and some slight sub-conjunctival ecchymosis on the right side. Both pupils dilated equally, and there was no impairment of vision. Examined by the ophthalmoscope the inner, though of course apparently the outer, half of both

optic discs, especially of the left, appeared much redder than natural; and the redness of the inner half contrasted strongly with the outer half of each papilla, which was even whiter and more glistening than normal. His tongue was covered with a dry brown fur.

On the following, the fifteenth day, he lay with his eyes closed, quite unconscious, and insensible to everything passing around him. He had not spoken since the previous day. He passed his evacuations involuntarily. Both pupils were equally dilated. There seemed to be complete facial anesthesia; for, the eyelids and the globe of the eye itself could be touched without any evidence of this being evinced. The most severe pinching of the face called forth no expression of uneasiness, though, when this was tried elsewhere, uneasiness and other evidences of sensibility were manifested. The purging continued. The pulse was much more thready and small; and the heart's action more rapid. Besides the eruption already described, a few erythematous patches had appeared on the arms.

On the sixteenth day he continued quite insensible. The condition of the pupils had changed; one, the left, was now dilated, while the other was contracted. The pulse was feeble, rapid, small, thready and irregular. Loud mucous râles were audible all over the chest; and his breathing was very laboured and hurried, owing to the quantity of mucus in the lungs and bronchi. He died at 11 a.m. No *post mortem* examination could be obtained.

PROCEEDINGS OF THE PATHOLOGICAL SOCIETY OF DUBLIN.[a]

Dr. Gordon, President.

Phthisis with Phthisis Laryngea.—Dr. MacSwiney exhibited the viscera of a man aged about fifty years, who died in Jervis-street Hospital. He was in hospital altogether for about a week, having entered it in an exhausted and moribund state. Both lungs were the subjects of very extensive tubercular deposit, the tubercle existing in a variety of stages. In some parts as a small semi-transparent grey "nascent" tubercle in some as masses of yellow infiltrated tubercle; while in other parts the abnormal deposit had been converted, by an attempt at cure, into a hard gritty cretaceous substance; and in the apices of both lungs, more especially the right, there existed large vomicæ half filled with a liquid consisting of pus, broken down lung-tissue, and blood. The case also afforded a good specimen of the pathological products of that variety

[a] These reports are furnished by the Secretary to the Society.

of tuberculosis known as laryngeal phthisis. The patient, upon admission, had considerable but not total loss of voice, and he complained of pain in the back of his mouth and throat, so great as to have almost abolished the power of swallowing. He said he was dying of starvation, as he was unable to swallow any nourishment. An inspection of the larynx demonstrated the extent to which it had been the subject of the tubercular disorganization. All its structures were thickened apparently from the deposit into their interstices of scrofulous matter. The vocal chords were nearly destroyed, and the mucous lining of the tube very much abraded. In many parts of its interior small superficial patches of ulceration existed. These were probably at first the seats of deposited tubercle, which, in the progress of the disease, had broken down and been expectorated.—14*th Dec.*, 1867.

Destruction of Hand by Machinery.—Mr. Collis said it would be difficult to recognize in the specimen presented to the Society the features of the human hand. The subject of the accident was a young girl, who, while feeding a turnip-cutting machine, got her right hand entangled in it, and immediatety all these terrific injuries were inflicted. There were twelve lines of incision at the distance of a quarter of an inch from each other, going right through not only the entire of the fingers, but through the metacarpal bones, which were denuded and splintered. From the enormous amount of injury in the palm and dorsum of the hand it was manifest that there was no alternative but amputation at the wrist, which was accordingly performed. Mr. Collis performed the amputation by the double flap through the wrist-joint. He did not interfere with the cartilages of incrustation for two reasons: First, there is no reason why they should be removed, as they do not interfere with the primary union of the stump; secondly, cut surfaces of bone are more liable to phlebitis from the exposed and wounded mouths of the numerous vessels which ramify through the cancellated tissue; while the sharp edges of recently divided bone are naturally more irritating to the raw surface of a flap than the smoothly-covered articulating end of the bones. He used acupressure with complete success, and brought the edges of the stump together by harelip pins, and dressed the wound with a lotion of carbolic acid for the purpose of destroying the fetor of pus, and rendering it unnecessary to interfere with the dressing at too early a period. There was, however, no discharge, the stump healing throughout by primary union, with the exception of about half an inch at one corner, where the integuments had not lain in accurate apposition. Even here there was a superficial granulating surface. It was the first case in which he had seen primary union throughout the entire tissues of a stump.—*Dec.* 21*st*, 1867.

Fibro-cystic Tumours in the Abdomen. - Dr. Lyons said the patient from

whose body the parts now exhibited were taken was a female, aged 45, the mother of several children, and until about 12 months since in the enjoyment of pretty good health. The chief features in her case were great abdominal tumefaction, occasional attacks of severe pain, and at intervals difficulty in micturition.

This last symptom appeared to be attributable to change in position of the tumour, which at times pressed on the ureters and bladder, and in a day or two afterwards the tumours seemed to undergo a kind of passive locomotion, and to get from off the ureters, and the urine immediately flowed in great abundance.

Dr. Lyons said this train of symptoms reminded him of an extraordinary case in which something similar took place. There was a total retention of urine for seven days caused by tumours pressing on the ureters. Uremic convulsions came on with great violence, and the convulsive movements of the body seemed to have the effect of working the tumours off the ureters, and an enormous quantity of urine instantly flowed, which drained through the bed and came down on the floor. The symptoms were relieved, but the patient survived only a short time. In the case now before the society the patient gradually sank, worn out and exhausted; and on the 7th inst. the *post mortem* examination was made. The tumours proved to be somewhat different from what he had expected. A large mass was found occupying the left iliac region; and another large tumour occupied the right iliac region. A third was situated in the superior part of the abdominal cavity, partly lying on the spine and pressed forward towards the umbilicus. This appeared to be the floating tumour which was moved backward and forward from the motion of the intestines, and was the seat of so much pain during life. On making an incision through this tumour it was found to be of a fibro-cystic character, it was of a very close and dense structure, having disseminated through it cysts varying in size. There was one very large cyst capable of containing a large hen-egg; next to it there was another also of large size and partly communicating with it; and there were two or three others at opposite sides of the tumours. The tumour which occupied the left iliac region was smaller than the opposite one, but its structure was denser throughout and the cysts were smaller and fewer in number. The next in size was the movable tumour which had the peculiarity not only of showing the dense structure throughout and some cysts, but a calcareous degeneration had taken place in the centre of it, proving that this tumour must have been in existence for a long time. Another of these tumours of considerable dimensions also was solid nearly throughout, and presented at its extremity two or three cysts. The contents of the cysts were alike, being a thick, serous, oily fluid, which exhibited albumen in great abundance on the application of the nitric acid. There was one close to the

junction of the ilium and the cecum floating about and attached to a very loose pedicle. One occupied a peculiar situation, and he was greatly surprised that it had not caused greater mechanical distress and suffering. It was attached to the fold of the mesentery, close to the insertion of the ilium into the cecum, and there it had compressed the ilium to an extreme degree so as to interfere considerably with the passage of fecal matter.

Dr. Lyons proceeded next to examine the uterus, and found the vagina intact, the os and cervix uteri not changed; there was a little vascularity at the orifice, but nothing more. In the wall of the uterus there was found a quantity of fibrous structure deposited.

The ovaries were not affected. These tumours appeared to have originated in the lymphatic glands, and then in the mesenteric glands here and there. They formed a globular mass, and some were detached and connected with the mesentery only by a very small pedicle.

The case was one of unusual interest, because of the great number of the tumours, and the peculiarity of this fibrocystic degeneration and calcareous deposit. The tumours had altered much in appearance, resembling in appearance on section encephaloid matter much more now than when they were first examined, but minute examination showed the true fibrocystic nature of the growth.—*January* 11, 1868.

Cancer of the Thyroid Gland and adjoining Lymphatics.—Dr. Stokes said the parts which he now submitted to the Society were taken from a man of 50 years of age, who had died lately in the Meath Hospital. He was admitted labouring under a prodigious distension of the neck, and, at the first blush, one would say it was a case of an extreme degree of bronchocele, for the tumour occupied both sides of the trachea, and looked extremely like the enlarged thyroid body. There were some circumstances, however, about the case, which led him to doubt this, and one of these was that the man was suffering from dysphagia. The dysphagia was œsophageal, not laryngeal—not the difficulty of swallowing, with coughing, which exists when the epiglottis is engaged, but was referred to a point lower down, beneath which no solid food could pass, but he was able to take liquid food. On closer examination, it was found the tumour was of unequal hardness—in some places there was a sensation as of cystic fluctuation, in other parts a stony hardness. The voice was affected, but in a curious way. He was not completely aphonic, but considerably so, and the aphonia was constant in degree and character. It had not that varying character which was seen in cases of aphonia produced by the pressure of an aneurism on the recurrent nerve, but quite constant. Under these circumstances, he came to the conclusion that it was a cancerous development of the thyroid gland. He was right in this opinion, but not correct in holding that the whole tumour was the thyroid gland. It would appear that the lymphatics of

the anterior and posterior mediastinum were the principal seat of the disease. A very remarkable appearance was exhibited during life, namely, the extreme dislocation of the trachea. The thyroid cartilage was pressed far over to the left side of the mesial line, and from that point the trachea could be traced downwards. The two circumstances which led him to diagnose carcinoma were, first, the sensation which the tumour gave to the hand; and, next, the extremely rapid growth of this vast mass. The patient was ill only five months. Another symptom which this patient had was a considerable amount of stridulous breathing; but, upon placing the head close to the front of his neck, it could be easily perceived that the stridor was above and not from below. In many cases of aneurismal pressure on the trachea, it was not difficult to determine that point, if the top be the point at which the stridulous sound comes forth; but in this case the stridulous sound evidently proceeded from the larynx itself. He did not say that this distinction obtained in every case of intra-thoracic pressure on the trachea, but it did in a great number.

The tumour was very large and had grown principally from the right side, and dislocated the trachea. It was a vast encephaloid mass. There was another tumour in the anterior mediastinum of the same character, very similar to the structure of the brain; and there was a third tumour in the posterior mediastinum, which was that which intruded on the œsophagus. The diseased thyroid gland was also exhibited, which, from its situation, gave the appearance of inequality to the two tumours during life. That which was supposed to be the right lobe of the thyroid gland was really not so at all. The left portion of the tumour was composed of both lobes of the thyroid gland, and the thyroid gland itself was also in a state of cancerous degeneration. There was no cancer of the lung or of any other organ of the body. It had been held by some pathologists that cancer was not to be enumerated as one of the affections of the thyroid gland, and that when cancer did engage the neighbourhood of the gland, so as to simulate cancer of that body, it was really cancer of the lymphatics about it. That might or might not be so originally; but in this case there was cancer of the lymphatic glands all round, and also cancer of the thyroid gland itself. He had been able to find very few cases on record of cancer of the thyroid gland. In the *Year Book* of 1859 there were five cases recorded by a German pathologist, and in the records of the Pathological Society, of which however, he had not been able to make a complete search, he found one case communicated by Dr. Quinlan, in the year 1859.—*January* 11.

Depressed Fracture of Skull.—Dr. Corley exhibited a section of a skull in which he had performed the operation of trephining. He gave the following details of the case: Mary Fitzgerald was admitted

into Jervis-street Hospital at half-past eight o'clock on the 18th of December. A few minutes previously, her husband, during a domestic quarrel, had struck her on the head with a three-legged metal pot, full of potatoes. One of the legs struck her on the left side of the head, immediately above the zygomatic arch, and rather closer to the ear than to the edge of the orbit. There was immediate and copious hemorrhage, and after uttering a single sentence she became insensible. She was in this condition when first admitted; and there was some obscurity in the symptoms, from the fact that she was said to have been drunk at the time of the assault. I saw her three hours after, and she was then in profound coma, apparently from compression of the brain, with a full labouring and intermittent pulse of 50, respiration slow, stertorous, and accompanied by flapping of the cheek, pupils dilated and temperature of skin increased. The wound, the bleeding from which had been with difficulty controlled, was small and crescentic, and scarcely admitted the finger in examination. The rent in the aponeurosis and substance of the temporal muscle could be felt, and then a depressed fracture situated at the anterior inferior portion of the squamous plate of the temporal bone. The copious bleeding having rendered venesection as a remedial measure inexpedient, and a large purgative enema having failed to abate any of the symptoms, I determined to remove the most obvious cause of the compression; and the increasing difficulty of the heart's action (as manifested by the character of the pulse and commencing coldness of the extremities) forbidding delay, at two o'clock on the morning of the 19th, assisted by my colleagues, Drs. Meldon and White, I proceeded to elevate the depressed bone. I may remark, concerning the operation, that on raising a flap of the temporal muscle the hemorrhage was so severe as to necessitate the keeping a compress in the lower part of the wound while I worked the trephine on the sound bone above, and when the elevator was applied the broken pieces were felt so loose that any attempt to raise them permanently was futile. I therefore resolved to remove them altogether, and as they were already, by the original violence, partly detached from the dura mater, I had no difficulty in separating them completely with a small forceps guided by my finger. It will be seen that the principal difficulty of the operation arose from the fact that the lower portion of the depression was absolutely under the zygoma, and its precise condition could only be ascertained by touch. A good deal of blood welled up from the bottom of the wound; but, for the reasons I mentioned, its exact source could not be seen, and it ceased directly on laying down the flap. Some signs of amendment immediately followed the operation. The patient moaned, vomited, her breathing became perfectly tranquil, and her pulse rose. There were some movements of the right side of the body, which had previously been quite inert, but there was no return of consciousness. Three hours afterwards her respirations

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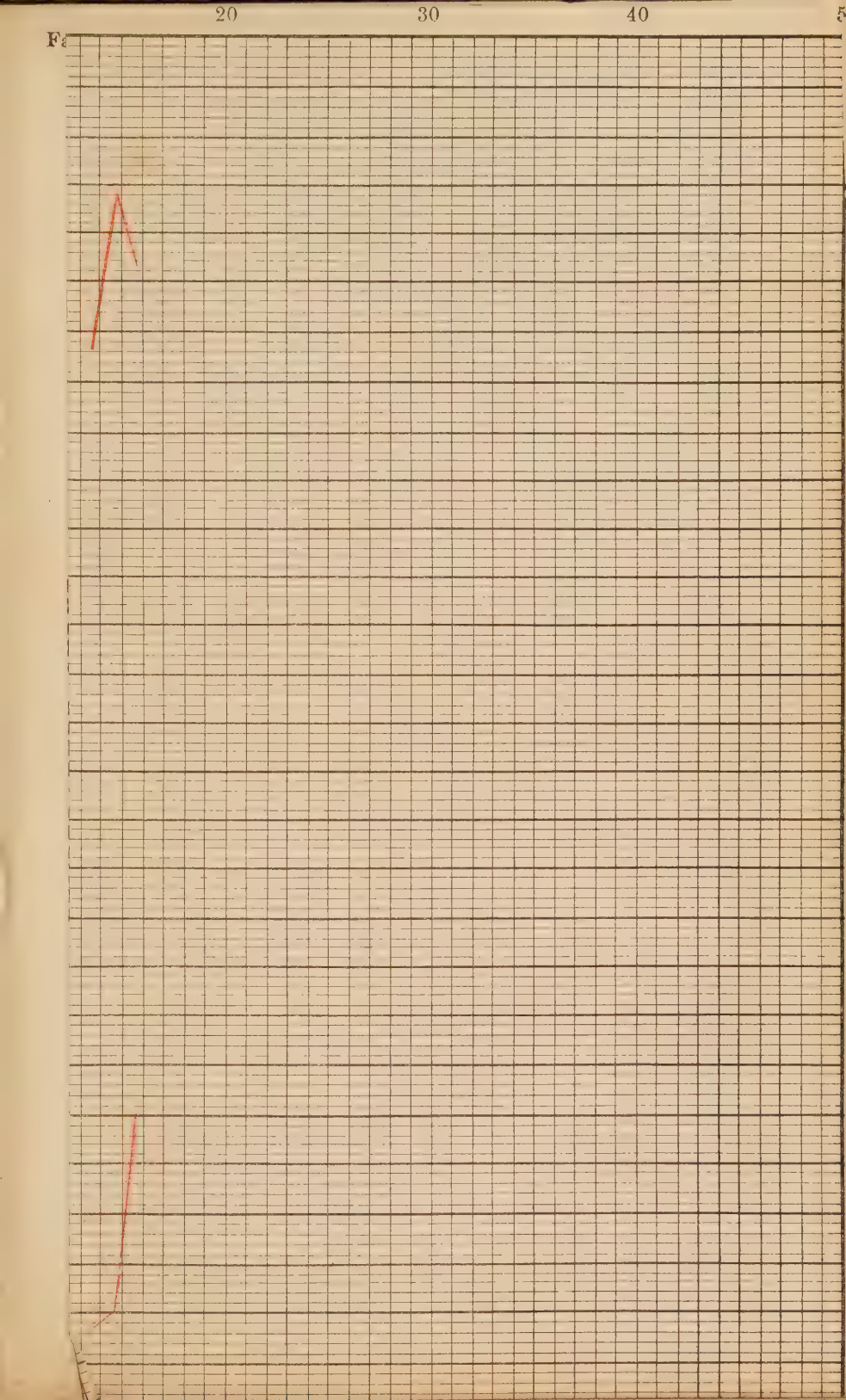
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were 24, pulse 114, and during the whole of the day she remained in much the same condition. Towards the evening both pulse and respiration became more hurried, and continued to increase until she expired at four o'clock on the 20th, 38 hours after the operation. The *post mortem* examination showed the condition now exhibited. The portions of bone (three in number) when fitted together show that the fracture was stellate, depressed in the centre of the star, and that the sharp edges had lacerated the dura mater in three places. When that membrane was opened the infero-lateral portion of the middle cerebral lobe presented a laceration into which the tips of three fingers could be inserted; but the most striking feature was the presence of a thick layer of coagulated blood covering the upper and outer surface of the left hemisphere, and flattening it to a most perceptible degree. The consideration of greatest interest about the case is the source of the effused blood, whether from a torn branch of the meningeal artery or from the lacerated cerebral vessels. The fact that one of the pieces of bone depressed presented a meningeal groove would point to the first conclusion, while the ease with which the external bleeding was stopped after the operation seemed to indicate the second. The result of the conclusion as regards the practice, would not have signified much, as even had it been diagnosed as arterial, from the nature and position of the injury, there would have been no other means available for controlling it than those used.

As trephining is an operation which has lost ground in professional estimation of late years, I have been particular in giving the details of a case in which the absence of a successful result cannot be attributed to the operation which, determined on as a last resource, accomplished the objects for which it was performed, namely, the removal of the compression by bone.

Large Urinary Calculus in the Female.—Mr. Porter said, on looking back through the records of the Pathological Society, he could not find that urinary calculus disintegrated by the lithotrite had ever been laid before them. Firstly, then, for that reason, and, secondly, because the disease was so seldom found in the female, he thought that it might not be uninteresting to exhibit the present specimen. He removed the stone, which he now held in his hand, from a patient in the Meath Hospital. She was a woman aged 45, and prior to her admission to hospital she had been suffering for a year and nine months from extreme irritability of the bladder, and at times most excruciating pain. About four months ago, she placed herself under the care of a medical gentleman in the country, and he looked upon her case as one of uterine disease, and treated her by the application of caustic to the os uteri. She received no benefit from the treatment, and was sent by a lady who

took a great interest in her to Dr. E. Kennedy, and he for the first time introduced a catheter into the bladder, and discovering the presence of a large caculus, sent her to him (Mr. Porter), and she was received into the Meath Hospital. On admission, she was suffering very much. She was admitted on the 24th of December, and she stated that on Christmas-day she was disturbed so frequently as eighteen times in one hour. Dr. Kennedy had had the urine analyzed by Dr. W. D. Moore, and the following was the result of his examination:—

The urine extremely turbid, highly albuminous, strongly alkaline, free from sugar, and contained but little urea. The specifiic gravity 1·015. On standing it deposited an enormous amount of ropy pus, entangling numerous blood-corpuscles, and crystals of triple phosphate, some epithelium, and earthy phosphates. Vibriones also, but not in motion.

The woman was now quite well, and the night before she left hospital for home she slept from ten o'clock until seven in the morning, without being disturbed. On a most careful sounding not any of the calculus could be discovered. He had the nucleus of the stone now in his hand. It appeared to be lithate of ammonia, around which a large phosphatic calculus had been formed. The weight of the detritus, except the small fragments which were lost (as happened in all these cases), was exactly 615 grains. The measurement of the stone, made on the first day of her admission, was one inch and a quarter.—*January* 25.

Œsophageal Obstruction.—Diffuse Inflammation.—Dr. Hayden submitted to the Society a case of œsophageal obstruction, diffuse inflammation, and death, due to the impaction of a piece of bone in the œsophagus. On the 17th of January, a man, aged 66, presented himself at the Mater Misericordiæ Hospital, declaring that he felt obstruction beneath the sternum, in attempting to swallow either solids or liquids. This difficulty, but in a less aggravated form, had existed for the last six months. His pulse was feeble, and slightly intermittent, but there was no evidence of any organic disease whatever. In the course of the night of the 17th, his neck became suddenly swollen, and his breathing greatly embarrassed, no such symptoms having existed at the time of his admittance. When Dr. Hayden saw him on the following morning, he found his neck greatly swollen, especially at the root. It was somewhat red and tender, especially at the left side. There was loud stridulous breathing, with a remarkable gurgling in the throat. No appearance of inflammation in the fauces. The man's pulse was exceedingly weak; all over the chest there were loud bronchitic râles but no other evidence of pulmonary derangement. The heart's action was feeble. Over the ensiform cartilage was heard a rough jarring murmur with the first sound; this did not exist in the heart. On attempting to swallow, the man complained of great pain at a point

corresponding to the lower part of the sternum; he declared that he could not make the liquids enter his stomach; that, to use his own language, "they were stopped at that spot," placing his hand over the sternum. At eight o'clock, p.m., he (Dr. Hayden) was summoned to see the man, who was declared to be much worse. He found him lying on his left side in a semi-recumbent position. There was loud laryngeal stridor; the neck was swollen, the pulse small, the surface cold. He requested the man to swallow some drink in his presence. He evinced great reluctance to make the attempt, but at length consented to do so. He sat up in bed, and made preparation for the effort. He performed the earlier stages of deglutition with the greatest ease, but about two seconds after he had taken the drink, he leaned forward, writhed with pain, placed his hand on the sternum, and said, "it is stopped there." There was no regurgitation, however, and the liquid, after a very brief period, entered the stomach, and then followed complete relief. There was no spitting of blood at any time, nor any history of swallowing or feeling a foreign body in the throat. Under these circumstances, he declined to recommend the operation of tracheotomy, which would have naturally occurred to one's mind in such a case, firstly, because of the existence of obstruction low down, and, secondly, because of the unfavourable issue in a similar case, in which he had performed the operation some years ago. On the following morning, at a quarter past eleven o'clock, the man died of syncope. It would be seen that the parts which he now exhibited showed the existence of diffuse inflammation of the neck. The glottis was remarkably œdematous; the epiglottis was very much swollen, but not red; and the tissues all round were likewise in this state. The walls of the pharynx were thickened and condensed, and the areolar tissue connecting the pharynx and œsophagus with the vertebral column was infiltrated extensively, and in a dark and sloughy condition, the result of gangrenous inflammation. He found about four inches below the larynx two sharp fragments of bone, about an inch in length, impacted in the œsophagus, placed at right angles with its axis, and lying side by side, held in juxta-position by a thin film of membrane, and transfixing the œsophagus at both those extremities. The punctures made by the extremities of the spicula communicated with a peri-œsophageal abscess, occupying chiefly the left side, and containing a considerable quantity of yellow, creamy pus. He was unable to trace any connexion between this abscess and the seat of the diffuse inflammation in the neck, but manifestly while the abscess had not become diffused, inflammation resulting from it had, and was the immediate cause of death. The aorta was atheromatous, the heart fatty, the left ventricle in a state of concentric hypertrophy, consequent on sudden death. The right cavities of the heart, both the auricle and ventricle, were filled with dark, liquid blood. This case was interesting in a diagnostic

point of view. The question arose, considering the murmur at the ensiform cartilage, whether it might not be a case of abdominal aneurism. He dismissed that idea, firstly, because of the absence of abdominal pulsation, and of pain, save on attempting to swallow; and, secondly, in consequence of the occurrence of diffuse inflammation; this could not have been the result of extravasation of blood from an aneurism competent to produce œsophageal obstruction, because, in such a case, death would have immediately followed. The case was, therefore, clearly one of abscess in the immediate neighbourhood of, and probably connected with the œsophagus. Two days after the man's death, when it was too late to have made the information available for a useful purpose, he was informed that, a few days previously, the man had swallowed a bone, whilst eating some bacon. He swallowed the bone, as reported, on Tuesday, and was admitted to hospital on Friday. He himself admitted that for six months previously the obstruction of which he complained had existed. The question arose whether these fragments of bones had been impacted in the œsophagus for a period of six months, or only from the Tuesday preceding his admission. He concluded the former was the case; for he did not think it possible that in a period of two days these foreign bodies could have given rise to an abscess of such large dimensions; and, secondly, because the man traced his illness to a period of six months antecedently. He inclined, therefore, to the opinion that he had unconsciously swallowed this portion of bone six months ago. The kidneys were in an early stage of cystic degeneration.—*January* 25.

Renal Calculus.—Dr. Bennett exhibited a branched renal calculus which he had taken from the body of a man who had died in July last in Sir P. Dun's Hospital.

He showed also specimens taken from the same body illustrative of the changes produced by peritonitis and by gout.

The patient was a middle aged man, a carpenter. For four years previous to his death he had been from time to time under the observation of Professor M'Dowel. At the commencement of that period he was admitted into the Whitworth Hospital suffering from ascites without any general dropsy. He was twice tapped, and the second tapping was followed by apparent recovery. He returned to his work, and continued free from disease for a year; after this interval the disease returned, and he was repeatedly tapped both in hospital and at his own home. In July last he was admitted into Sir P. Dun's Hospital; he was suffering greatly from the amount of fluid in the abdomen. He was unable to breathe lying down, and he was generally anasarcous; his urine contained a considerable quantity of albumen. At his urgent request he was tapped, and the operation was followed by general peritonitis, which was fatal in two days.

On opening the abdomen the usual appearances of acute peritonitis were seen; a quantity of recent lymph was effused over the coils of intestine, and much purulent fluid escaped, but there was evidence of the occurrence of a former attack of peritonitis, probably chronic, in the condition of several of the viscera. The intestines were in many places adherent, the adhesions being old and firm, composed of a substance almost like cartilage. The liver was most remarkably altered in appearance by this deposit; every portion of it except the part which is uncovered by peritoneum was of a pearly white colour; all trace of the normal shape was gone; the bulk of the gland was much diminished, and it had somewhat the appearance and shape of a gigantic testicle; on cutting into it these changes were found to be produced by great thickening and contraction of its peritoneal investment; the white covering was more than a line in thickness and of cartilaginous hardness; the gland tissue seemed healthy, though much diminished in quantity. The spleen was covered by a capsule similar to that of the liver, but it differed from it in the fact that it was capable of being separated from its capsule by very slight force; the tissue of the spleen, like that of the liver, was healthy.

The right kidney was enlarged and pale in colour; its pyramids were streaked with white deposit in the direction of the straight tubes. On microscopic examination the deposit was found to consist of the crystals found in gouty deposits—lithate of soda. The nature of the deposit was verified by the examination of the articulation of the ball of the great toe; this joint on one side was the seat of copious deposit of lithate of soda, which, as the specimen on the table showed, gave the characteristic reaction with nitric acid and ammonia.

The left kidney was converted into an irregular cyst, which was

completely filled with calculous matter; very little of the tissue of the kidney remained in the structure forming the covering of the calculi. The large calculus exhibited weighed 452 grains, and was a complete cast of the pelvis, infundibula, and calyces of the kidney; it presented polished facets on the parts which filled the calyces, and on these facets there rested an immense number of detached calculi and a great deal of gravel. The composition of all the calculi seemed identical. They were all invested with a thin yellowish covering, easily detachable, and the remainder was white, very brittle, and crystalline. A chemical examination of the central portion gave the following result:—

Phosphoric acid, . . .	31·12
Ammonia, ...	8·14
Magnesia, ...	12·52
Lime, ...	14·26
Water, organic matter, and alkaline salts,	33·80
Loss, ...	·16
	100·00

This is reducible to the following form:—

$NH_4O,2MgO.PO_5+12HO=8$

$3CaO,PO_5+$trace of $CaO=1$

This analysis shows that the calculus was a pure crystalline deposit of the mixed phosphates. The only part containing any trace of lithic acid was the investing film.

The composition of the calculi in this kidney differing so widely from that of the gouty deposit on the opposite side is of much interest; it is probable that if a section could be made of the branched calculus, which has not been attempted for fear of injuring so perfect a specimen, that a lithic acid nucleus would be found in its central stalk.—*January* 25, 1868.

Typhoid Ulceration of the Intestines.—Dr. Lyons brought under the notice of the society a remarkable example of typhoid lesion in the intestines. The case was that of a young girl admitted to the Hardwicke Hospital on what was said to be the fourteenth day of her illness, but he thought it extremely likely that she had been ill for a longer period. She was very low when admitted, and had all the well-marked symptoms of typhoid fever, which had been, as all hospital physicians were aware, prevalent to a remarkable degree during the present winter. The patient laboured under constant diarrhea, which was controlled with difficulty. She had an exceedingly feeble pulse, which was at first 108, but gradually rose. When about ten days in hospital she seemed to a considerable extent to be relieved in regard to most of her urgent symptoms. So much better did she feel

herself that she got up without permission and sat at the fire, and thought she had fully recovered from her illness. There was always, however, an unhealthy appearance about her, and Dr. Lyons said he was not surprised to find that she relapsed, and in a few days afterwards she began to pass blood in large quantities; the blood was little altered in appearance, being well coloured and distinctly recognizable blood, instead of the mere ordinary melena. The diarrhea continued, and it is remarkable that she did not complain of local pain. The abdomen was repeatedly examined, and exhibited no tenderness or any great amount of distention. There were other cases in the wards at the time suffering much more severely from diarrhea than she did. The hemorrhage was very copious, and ran her down very much, but she did not seem to die from the direct effects of loss of blood, for no hemorrhage of any extent occurred for three days before her death.

There seemed to be a sudden revulsion towards the pulmonary system, a sudden effusion into the bronchial tubes, and she died from bronchial suffocation.

A *post mortem* was made, and although expecting to find some considerable degree of disease in the intestines, Dr. Lyons said that he was astonished to see what an enormous amount of typhoid deposit there was in the glands and patches of Peyer—not confined to the small intestines but travelling down through the large intestines. On slitting up the intestine they found, higher up than usual in the ileum, a patch of Peyer, highly loaded with deposit, very prominent above the surface, and with large jagged ulcerations. He thought the ulceration appeared to reach higher up and the enlargement of the patches was greater than he had seen in any case recently. It was known that under certain normal circumstances the patches of Peyer were to be found beyond their ordinary limit, and they were noticed occasionally in the jejunum, and even that they had been occasionally found still higher up in the duodenum. In this case they seemed to be in unusually great abundance in the ileum and part of the jejunum, and the amount of ulceration and deposit was very extreme. In cases such as this nothing could be done to save the patient's life; the amount of disease was too great to admit of any remedial agency being applied with benefit. Travelling still further down the intestine the same diseased condition was repeated, but to a more enormous degree. Here were observed excavations one-eighth of an inch and even a quarter of an inch deep. Travelling still further down the lower patches were found more advanced in the lesion. It could be noticed in some of the lower patches which forcibly attracted attention that a great part of the gland structures was excavated, and a large amount of the deposit had been detached. One oval patch, an inch and a half long and an inch in its transverse diameter, was very conspicuous, in which nearly three-fourths of its texture had been eaten

away. Coming to the last patch, occupying its usual position on the iliac aspect of the iliocecal valve there was found immense destruction of the substance; deep-eating ulceration had removed the deposit, which was very thick, and the base of the mucous membrane was laid bare. It was well known that in cases of typhoid lesion of the intestine the morbid process usually seemed to be stopped by a mechanical barrier, as it were, at the iliocecal valve. Even in cases where perforation had taken place, followed by peritonitis, the lesion was not generally found below this valve. In the present case that gate or barrier seemed to have been eaten through, and the disease had passed the limit of the iliocecal valve, and was to be found in a still more inordinate degree in the colon. Few, he ventured to say, had ever seen a more extreme degree of disease than in the colon he now exhibited. First passing into the diverticulum of the vermiform appendix there was found extensive lesion of the glands in this organ. It was of a bright crimson red, and there could be no doubt a great deal of the hemorrhage observable during life had taken place from this portion of the mucous membrane. Travelling down the large intestines further evidence was seen of engorgement of the minute glands of the colon. In their normal condition these minute glands were not readily visible; it was difficult to get evidence of their presence by the unaided sight, but here they were very distinct, rising prominently above the surface, and containing a large amount of deposit in their interior. Here and there patches of the large intestine were deeply ulcerated, and the mucous membrane was almost eaten through. As they passed further down the ulcerations increased in number, but the disease was at its maximum at the upper end of the colon, and chiefly in the cecum or caput coli.

Interspersed here and there, but not very extensively, with the deep deposit in the glands there seemed to be something of a dysenteric exudation in parts of the the intestinal surface. As they passed towards the rectum they found the disease existing to an extraordinary degree; the glands very large—prominent above the surface; the deposit very considerable, in many instances excavated away, and the mucous membrane laid bare. It was only surprising that this poor girl lived so long, and was able to resist that extreme state of disease for such a lengthened period. He had himself seen many cases of this typhoid disease, and he had a large number of examples of it in his museum, which he obtained in the Crimea, and he did not think there was a single specimen exceeding in amount and intensity of deposit what was seen in the present case.—*February* 8, 1868.

Intra-uterine Fibrous Polypi.—Dr. Kidd said the preparations he had to lay before the Society were more interesting in consequence of their number than from anything either in their character or appearance. It

was very well known to pathologists that fibrous tumours growing from the external surface of the uterus were frequently very numerous; but when fibrous tumours, or polypi, arise from the interior of the uterus they do not grow so—in fact, there was seldom found more than one in that situation. Dr. Denham, in the course of last session, exhibited to the society a uterus with fifty-three fibrous tumours growing on the outside of it, and cases where they were still more numerous are on record; but he (Dr. Kidd) did not know of any author who mentioned a number of fibrous polypi growing from the interior surface of that organ. The specimens he now exhibited were polypi that he had removed from the interior of the uterus of a young woman, in the Coombe Lying-in Hospital, who had suffered from menorrhagia for a period of fourteen years. She was thirty-six years of age, of anemic appearance, scarcely able to walk, and her breathing exceedingly short, and the colour of the lip could scarcely be distingushed from that of the cheek, the lip was so completely blanched. The os and cervix presented a healthy and natural appearance, but the body of the uterus was longer than usual; in place of two and a half, it measured three inches. The fundus of the uterus at that time could scarcely be distinguished above the level of the pubes. It could be felt by the bi-manual method of Marion Sims, but could not otherwise be distinguished. On consultation with his colleagues, Drs. Ringland and Sawyer, it was determined to dilate the os and cervix and explore the interior of the uterus; and, on doing so, the three tumours that he now exhibited were discovered growing in the cavity of the uterus, near the fundus, and were removed by the ecraseur. After this the hemorrhage greatly diminished, and she left the hospital, but at that time the uterus had not recovered its normal size—the cavity of the uterus measured three inches in length. She applied again at the hospital, the week before last, saying that the hemorrhage was increasing again. The body of the uterus was now considerably larger than when first examined. It rose above the level of the pubes. The os was completely closed, and presented no appearance of disease. The os was again dilated till a finger could be got into the cavity, and nine tumours were found growing in different portions of it. Three of the tumours were found growing close to the os internum, on the anterior wall. The two largest were at the fundus of the uterus. The others were growing upon the posterior wall. The interest of the case consisted in the great number of the tumours. It was quite possible this second group may have been there in a rudimentary state on the occasion of the first operation. He certainly did not feel them then. If they existed at that time in a rudimentary condition, removal of the other tumours, of course, gave them an opportunity of developing themselves. He inferred that this was the case from the fact of the uterus never having recovered its normal size.—*February* 22.

Aortic Aneurism.—Dr. JENNINGS brought forward a recent specimen of aortic aneurism, as also several casts of the chest taken at different periods during the progress of the case.

The case, he observed, was invested with the deepest interest in every point of view, as well from the unusual duration of the disease—a period of more than ten years—the vast size attained by the tumour, which was as large as a human head, its gradual growth in its earlier stages, during which the patient was able to prosecute his trade for so many years, but particularly from the absence of so many of those symptoms, as well subjective as objective, which are enumerated by authors as characteristic of this affection (in this respect, it might be considered almost unique), and the expression of others, to which, so far as he was aware, attention had not as yet been directed.

The patient, Matthew Evoy, a man of muscular habit, aged forty-four years, who had been admitted into the South Dublin Union on the 29th June, 1867, in apparently perfect health, and had retired to bed on the night of the 1st July without having made the slightest complaint, was found on the following morning in a state of complete insensibility. When seen by Dr. Jennings about eleven o'clock on that day, he was lying on his back, motionless, silent, with closed eyelids and compressed lips, the temperature of his body being perfectly natural, and his respiration tranquil and free from the slightest stridor. When the eyelids were separated the pupils were seen to be natural in size, but completely unaffected by the admission of light.

This state of tranquil immobility, however, was reported by the attendants to have been occasionally interrupted since his admission into hospital by attacks of vomiting and restlessness, his struggles then being restrained with much difficulty, and by indistinct mutterings. The heart's action over the entire precordium was found to be extremely faint and rapid, and the pulses at both wrists strictly similar in character, and equally weak, though strong visible pulsation was observed in the carotid, subclavian, and humeral arteries. A conical tumour, several inches in height, and having a base of considerable extent, with double-heaving impulse, visible over its entire surface, was seen situated over the upper part of the sternum, while a second centre of pulsation, though much less distinct, was observed below the left nipple. In neither situation could any bruit be detected.

When loudly addressed by name he languidly opened his eyes, but made no attempt at reply. When shaken, rather roughly by one of the spectators, he raised his head, and expectorated to a considerable distance, displaying perfect control over the muscles of his mouth.

On the following morning the insensibility was found to be much less profound. He seemed semi-conscious, constantly muttering in an incoherent manner, and was still incapable of being sufficiently roused to

give distinct replies. He still lay on his back with his eyelids semi-closed, the pupils being still unaffected by influence of light. The arterial throbbing in the neck and arms, though still perceptible, had much diminished.

When a cup was applied to his lips he drank with the utmost freedom; his respiration was regular and unembarrassed; he did not suffer from cough, nor could the slightest trace be detected of facial paralysis or deformity, nor any difference in the temperature of the ears. The radial pulses were alike, being small, frequent, and compressible.

The throbbing action in the tumour was not by any means so distinctly double as on the previous day, being now chiefly systolic in character.

Percussion failed to detect any perceptible difference in the resonance of the posterior and lateral regions of the chest, at opposite sides, both yielding sounds of similar and normal clearness, seeming also, when viewed from behind, to retain their healthy relation as to size, and to expand equally during inspiration.

When visited on the following afternoon (July 4th) he was found lying on his right side, and was reported to have passed a tranquil night, the vomiting not having recurred since two o'clock on the previous day. His muttering and restlessness also were much less constant, though his condition as to sensibility and sensation, continued unchanged. The general arterial throbbing was still further lessened, and the pulses at the wrists, were likewise much reduced in frequency, being also soft, very weak, and obliterated by the slightest pressure. The heart-sounds over the precordium were faint, being heard much more distinctly over the tumour, in which the impulse also had resumed its double character, the violence of pulsation being however greatly lessened.

When loudly addressed he occasionally made pertinent answers, though, in general, his replies had not the slightest reference to the subject of inquiry.

On the morning of the 5th, his right arm was found completely paralysed, its temperature, however, being natural. When roused by being shaken, or loudly called by name, he would start as if from sleep, stating his age, trade, name of his employer, or his own, as the case might be. One or other of these replies he invariably gave to any question or command of whatever nature addressed to him. His loss of intelligence was evidently complete, and his compliance with the demands of nature involuntary.

The pupils were now observed to be both normal in size, and to act readily on admission or exclusion of light. His daughter informed us that the paralysis of the right arm had attacked him for the first time about four months previously, when he had been carried home insensible, and that it had disappeared after the lapse of three days, when he again returned to work. She further stated that the growth of the tumour,

which had appeared about ten years previously, after unusual exertion undergone in the launch of a ship, was attended with occasional paroxysms of agonizing pain, which lasted for one or more hours, absolutely depriving him of reason for the time, and then gradually subsiding. The exhaustion, however, of these attacks rendered him unable to work for several days.

This statement, as to the fugitive nature of the paralysis in his first seizure, was verified on the present occasion, when on the following morning, examination showed that it had completely disappeared, though all other symptoms continued unchanged for several days. On the 14th July a marked improvement was observed in the brightness and intelligence of his manner which, from having been dull and heavy, now became lively and vivacious. He made several voluntary observations, and when addressed, promptly replied, though his words had still no connexion with the topic of conversation or with the question proposed. He now also intimated by gesture his want of the urinal, &c. His restlessness at this time was so extreme as to require the use of cross straps over his chest and thighs, without which he could not be kept in bed. In this state he remained until the beginning of August, his intelligence still further improving, when he one day surprised Dr. Jennings not a little by directing his attention to the eyes of the patient in the next bed, which he remarked were very sore, as was the case.

On the morning of the 2nd November he was found to be paralysed in the left arm, its use, however, being recovered after a few days, though not so completely as that of the right had been. During the past four months the tumour had rapidly increased in size, and his manner and appearance had lately again become dull and idiotic, continuing so until the 10th December, when he was suddenly seized with furious delirium. After the partial subsidence of this attack he complained of great pain in the tumour, which he guarded with expanded hands, both when asleep and awake.

When the violence, which continued for several days, had altogether disappeared, his manner became more rational than it had been since his admission. He answered several questions with perfect correctness, as, his name, that he felt better, and when asked his age, replied, "twenty-one or twenty-two," proving that, though he failed in making a correct reply, he comprehended the subject of inquiry. He also, when Dr. Jennings silently moved his lips, as if speaking, at once rose from his seat, said "Sir," and requested him to repeat the question, as he had not heard it.

On the 16th February a difference was for the first time perceived in the radial pulses, the right being eighty and steady; the left rapid and very indistinct. During the course of this day he had two or three convulsions. The lower part of the tumour was seen to be very discoloured,

and even beginning to slough at one point. The oozing of blood, which had commenced from this point a few hours subsequently, was checked on the following morning by the application of sesquichloride of iron and cold. During this interval he lay on his back in a state of stupor, though drinking freely and easily when the cup was held to his mouth.

About five o'clock on this day he, of his own accord and unaided, arose from his bed and went to the fire, where he remained until removed by the attendants; after the lapse of some hours he again left his bed, and continued walking about until morning, moaning in a most distressing manner; and, when he did return to bed, keeping his head bent forward on his knees.

From this date he continued in a state of stupor, more or less profound at different periods, until his death, which occurred on the 26th February, when he gradually yielded to *asthenia.*

The *post mortem* appearances, as described by Dr. Purser, who had been kind enough to conduct the autopsy, and whose valuable assistance Dr. Jennings gratefully acknowledged, were as follows:—

"On removing the calvaria the brain was seen to be considerably atrophied and not nearly to fill the membranes which, in several places, lay folded over it. A considerable quantity of fluid was found in the arachnoid cavity, and subarachnoid spaces, as also in the ventricles. The arachnoid itself was thickened, pulpy, and gelatinous. The upper and outer parts of both hemispheres were of a dirty yellowish colour, and the convolutions smaller and more depressed than usual. The brain substance was brittle in consistence; contrary to expectation no emboli were found in any of the larger cerebral vessels which, as also the carotids, were empty to an unusual degree; but large coagula occupied both the pulmonary arteries. The heart was in a state of fatty degeneration, and all its cavities were enlarged. The valves seemed healthy. On slitting open the aorta from behind, the aneurism was seen to spring from the front of the ascending part of the arch immediately above the semi-lunar valves, the aperture of communication with the vessel being circular in outline, and about three inches in diameter, and its circumference thickened, rounded, and prominent. The sac was filled partly by coagula of blood and partly by fibrinous masses. The coats of the aorta were found to be freely occupied by atheromatous deposit and osseous plates."

Dr. Jennings remarked that the connexion which undoubtedly existed in this case, in the relation of cause and effect, between the aneurismal tumour and deranged cerebral nutrition, evidenced as the latter state was by partial or temporary paralysis, by the various phases of aphasia, by idiotcy or mania, from all of which this patient had suffered at various periods of his illness, was a subject of the very deepest interest, and that it was a fair question for consideration, whether brain softening or extra-

vasation (whether sanguineous or serous) was not too generally regarded as the only sources of local lesion of nervous power and impairment of the intellect, when they might be produced in reality by far different and remote causes inducing an arrest, or decrease of arterial supply in the larger or perhaps in capillary vessels of the brain. Had there not been in the present case a pulsating external tumour, the character of which was unmistakable, few, if any, would have attributed these physical signs to their proper cause. He also considered that the absence of the ordinary evidences of thoracic aneurism, as enumerated in medical works, as likewise of those to which attention has lately been drawn by Dr. William Moore in his article "on the Diagnosis of Thoracic Aneurism," such as dulness of one side, facial lividity, inequality of the respiratory murmur and expansion of the opposite sides of the chest, the alterations produced in the pupils, the appearance of cuticular eruptions, difference in the temperature of the ears, paralysis of particular facial muscles, was fully counterbalanced by the second centre of pulsation, and those rare physical signs observed in the case just recorded.

Encysted Hydrocele from the Inguinal Canal of a Female.—Dr. Bennett showed an example of encysted hydrocele taken from the inguinal canal of a female. He found the specimen in the course of a *post mortem* examination of the body of a woman who died of chronic renal disease in Sir Patrick Dun's Hospital a few days previously.

The cyst extended from the external abdominal ring to the internal, and could be pressed into the abdomen some little way; it lay directly in contact with the round ligament of the uterus, and was inseparably connected at its internal extremity with the peritoneum. From these facts he was justified in concluding that it was formed by accumulation of fluid in an imperfectly obliterated canal of Nuck, in the same way as the hydrocele of the spermatic chord in the male was formed. The fluid was a clear serum of the ordinary character. He exhibited the specimen, as he thought it of interest in comparing the diseases of the corresponding parts of the male and female.—*March* 14, 1868.

Large Hydatid Tumour in the Abdomen.—Mr. Hamilton said that the subject of this case was admitted into the Richmond Hospital with a large tumour in the abdomen. A swelling occupying the left side was quite obvious to the sight. It was prominent, and presented a remarkable contrast to the right side of the abdomen, which was emaciated and sunken. On examination the tumour was found to extend from the ribs down to about a hand's breadth from Poupart's ligament. It extended on the opposite side to a little beyond the umbilicus, and behind to four or five inches from the spine, encroaching on the left kidney. The tumour was smooth on the surface, and of an oval form, elastic and fluctuating,

the presence of fluid being very distinct. The hand could not be passed between the upper part of the tumour and the spleen, which appeared continuous with the tumour, and there was dulness on percussion about four or five inches above the lower margin of the ribs, showing that the upper part of the tumour occupied the situation of the spleen. We had, therefore, a somewhat elastic, fluctuating tumour, evidently containing fluid, occupying a large portion of the left side of the abdomen, and probably springing from the spleen, or intimately connected with that organ. To discover how far the tumour was fixed, I turned the patient on his right side, and found that the tumour continued immovable. When he sat up, it kept its position, and was clearly fixed by extensive adhesions. I should have had no hesitation, under the circumstances, in puncturing the tumour and letting out the fluid, but the state of the man's general health was such as to forbid any operative treatment—his health was completely broken down, he laboured under cough, hemoptysis, profuse sweating, with rapid pulse. Although there were no local physical signs of phthisis, yet it was sufficiently clear from the symptoms that there were tubercles in the lungs. Extensive sibilant râles were the only auscultatory phenomena. He had, occasionally, attacks of delirium. He would answer questions reasonably; but when left alone, he would ramble, and be inclined to get out of bed, not unlike a person in *delirium tremens*. He vomited every thing he took. His only craving was for whiskey, of which he had been a large drinker for a considerable time previously. He was, therefore, not a subject upon whom to perform any operation—it would only hasten his death, and could give very little relief. Strange to say, this large tumour gave very little uneasiness. There was one place at the lower part where it was tender on pressure; but, if left alone, he suffered very little annoyance from it. There was one symptom which distressed him greatly—namely, an almost incessant desire to pass water, every hour at least. The urine was not unhealthy. It was examined by the resident pupil, Mr. O'Farrell, and he found no albumen in it, or any deposit. Very recently, I saw a case in consultation, in which a gentleman had a very large tumour in the left side of the abdomen, which was clearly malignant, large, nodulated, and solid. But in his case the most distressing symptom was an almost incessant desire to pass water. Every half hour he had a desire to do so, and he would scarcely have fallen asleep when he would awake, and be obliged to get up again. I have no doubt it was the pressure of the tumour irritating the kidney which caused this most distressing symptom. After being in the hospital about ten days, the patient whose case I now bring before the notice of the Society, died. On opening the abdomen the following appearances presented themselves. The tumour was adherent in front to the omentum and the walls of the abdomen; it was adherent to the diaphragm and to the large end of the

stomach, and also to the liver by close adhesions, which had to be broken up to exhibit the entire of the tumour. Below it was adherent to the colon. But it was not adherent to the kidney; but it rested on that organ, and had flattened it by its pressure. Now, with regard to the spleen. The question was how far it arose from the spleen, or was connected with disease of that organ. At the upper part of the spleen, by using a little force, the adhesions to the tumour were, to a certain degree, broken up; but, after that, any attempt to separate the spleen from the tumour only ruptured the spleen. In fact the spleen had become, as it were, amalgamated with the tumour. The wall of the tumour is strong and thick; but in some parts it is diaphanous, showing the fluid within. The difficulty is to prove where the disease originated--whether it was connected from the first with the spleen, springing from a hydatid cyst in it, or had its origin independent of it, but, having grown up in that situation, became adherent to it. There was one feature worth noticing, that the most tender portion was below, where we find the adhesions with the colon; rendering it most probable that, if this man had lived for some time, the cyst would have broken into the colon, and its contents passed off, and a cure, other circumstances permitting, in that way effected. The diagnosis made was that the tumour contained fluid, and that, possibly, it might prove to be a chronic abscess of the spleen. I have seen abscesses of the spleen--not often, for it is a very rare form of disease—and it reminded me of them. At the same time I said it would be utterly impossible to make a certain diagnosis in a case of the kind. Mr. Hamilton then opened the tumour, and out gushed a clear fluid like water, containing an immense number of hydatids, varying in size from a pea to an apple, perfectly round and transparent, the larger ones looking like soap bubbles. A section of the spleen and upper part of the cyst showed the latter to be unconnected with the interior of the spleen, but firmly united to it by thick adhesions. The substance of the spleen was soft, and easily broken up into a pulp, rather paler than usual; the liver hard and contracted, the kidnies affected with Bright's disease, and the lungs throughout contained tubercles. The case, therefore, presents us with a remarkable instance of an unusually large cyst, full of acephalocystic hydatids, and exemplifies the observation of Tyson, made near 200 years ago, that hydatids are most frequently met with in serous cavities, and in persons of broken down constitution.—*March* 28.

PROCEEDINGS OF THE DUBLIN OBSTETRICAL SOCIETY.[a]

THIRTIETH ANNUAL SESSION.

Dr. Hardy, President.

Hydatoid Ovum.—Dr. J. Guinness Beatty exhibited a mass of hydatids which were discharged by M. F., aged forty, who has had three living children and three miscarriages. Her last child was born the 26th July, 1866, and this she nursed till 1867, or just seventeen months, during which period she felt herself quite well in health, but her menses returned regularly in March (after nursing eight months); they ceased *suddenly* about last December; but in February a change came which lasted only seven days, but returned again in a fortnight, and have continued, almost without interruption, up to the present moment.

She was admitted into the Rotundo Lying-in Hospital on Monday, the 11th inst., greatly swelled, and her stomach exceedingly hard. All that night she was very ill, and had great loss, till about four o'clock, a.m., the mass of hydatids passed, and now she only complains of great weakness and loss of appetite. During the aforementioned period she has always lived with her husband.—*May* 9, 1868.

Case of Enormous Fibro-Cellular Tumour of the Vagina removed by Operation—Recovery. By Thos. Edward Beatty, M.D., M.R.I.A., Honorary Fellow of the Obstetrical Society of London, &c., &c.—While fibrous tumours of the uterus are abundant, such excrescences from the walls of the vagina are rare. Many writers of eminence who have treated of female diseases make no mention of them in their works. In searching the treatises of Ashwell, Gooch, Becquerell, Simpson, Baker-Brown, and Bernitz and Goupil, I find no allusion to fibrous tumours in this situation. Others, as Bouvin and Duges, Scanzoni, M'Clintock, and Graily Hewitt, take notice of such affections, and give accounts of some remarkable cases. Dr. M'Clintock says:—"Our knowledge of these tumours is at best fragmentary and imperfect, and the recorded examples of them extremely limited in number" (p. 197). And again, at a subsequent page, he remarks:—"As showing the rarity of these fibrous tumours of the vagina I may mention that Dr. West only met with one example. Dr. R. Lee states that no case of fibrous tumour or fibrous polypus of the vagina had ever come under his observation; and Dr. Churchill only records one instance at all analogous to the description of growth now under consideration" (p. 200). Although cases of this disease are rare, the diagnosis is not difficult when the tumours are

[a] These Reports are furnished by Dr. Geo. H. Kidd, Secretary to the Society.

of moderate size, such as those recorded by Dr. M'Clintock and Scanzoni. In his observations on this disease, Dr. Graily Hewitt remarks:—"These growths are not common: they occur of various sizes, and of different degrees of density. Thus there is the fibrous polypus of the vagina resembling the fibrous polypus of the uterus in its hardness and general shape; there is also a form of polypus described by Scanzoni, the mucous polypus of the vagina. Both of these tumours are easily recognized by the finger introduced into the vagina. The fibrous polypus of the vagina may be so large as to project externally, dragging the vaginal wall down with it" (p. 194, 1st ed.) This is what occurred in one of Dr. M'Clintock's cases, of which he has given a representation. But the tumour may be so large as to prevent us reaching the pedicle, and thus materially obscure the diagnosis. Of this the following is a remarkable case:—

Anne Murtagh, aged forty-two years, mother of several children, was brought to me by Dr. MacEvoy, of Balbriggan, and admitted into the City of Dublin Hospital on the 24th of August, 1867. She was worn and emaciated to a great degree, and was scarcely able to walk from excessive debility. This condition had been increasing for some months, and was owing to a very severe and almost constant hemorrhage from the vagina. On making examination with the finger it was at once arrested, on entering the vulva, by a large, firm, fleshy tumour, with a peculiar doughy feel. The finger passed freely round as high as could be reached, but no pedicle or connexion with any part could be detected. The next day Dr. Kidd saw her with me, and with a view to a more complete examination of the case I got the patient under the influence of chloroform. I now passed my entire hand into the vagina, and even then found it impossible to trace the connexions of the tumour, it was so very large, and so completely filled the vagina. Dr. Kidd was not more successful than I was in his attempt to reach the neck of the tumour. It therefore remained a matter of doubt from what part this enormous mass arose. It was plain to us that the only chance of saving the woman's life was the immediate removal of the tumour. Excision was out of the question, for in the first place I could not tell the nature and extent of the attachment, and in the next, if I had full knowledge of it, it would have been impossible to reach it. For the same reasons the ecraseur was inappropriate. I therefore determined to attempt its removal by the ligature. After a very long time spent in passing the ligature by Gooch's double cannula, I encircled the tumour as high as I could, and strangulated it. The ligature was tightened every day, and on the eighth day the instrument came away, having cut through all that had been included in the noose. The tumour was now a mass of dead material, but so firmly grasped in the vagina that it was impossible to extract it at the time. A wash of Condy's fluid was injected into the

vagina by means of a strong syringe; and on the next day, when prepared to extract the mass by force, I found it had been expelled in the course of the night. On examining the vagina with a large speculum, it was found that the tumour had grown from the upper and left side of the vagina, a new wound about the size of a half crown piece marking the place of its attachment. The patient was sustained with wine and nourishment. All hemorrhage ceased from the time the ligature was applied, and she made a slow but steady recovery, and left the hospital well in three weeks afterwards. I now exhibit the tumour. It is more of the nature of fibro-cellular than pure fibrous tissue. I regret I did not weigh it when removed. It has been ever since preserved in a strong solution of carbolic acid. Tumours of large size, such as this, have been removed. Dr. M'Clintock alludes to one by Kiwisch that weighed ten pounds, and one by Mr. Paget that had a diameter of five inches. M. Baudier removed one weighing ten and a-half pounds. Such cases are very rare, and I never meet with one so large as that now exhibited.—*April* 11, 1868.

Mr. Harley *read a Case of Gonorrheal Rheumatism occurring after parturition*:—On the 23rd of August, 1867, J. F., a servant man, of about forty years of age, of a fair complexion and strumous appearance, came to me to be treated for gonorrhea. It was a tedious case, as the discharge returned again and again after disappearing for some days.

He was a married man, and his wife was at this time in the country. She came up to town about the first of October, and very soon after called on me to say that she expected to be confined in a month, and to ask me to attend her. At this time her husband was occasionally suffering from a return of the discharge.

On the 28th of October she was delivered of a healthy female child. She suffered a great deal during the labour from what she called extreme soreness of the parts, such as she had never undergone in any previous confinement; this was the fourth child. She kept up a constant and horrible screaming all through her labour; such screams as we usually only hear when the last pain or two expels the head.

October the 29th, the day after she was confined, my attention was called to an inflammation of the child's eyes, accompanied with a purulent discharge. I directed that they should be well bathed with milk and water, and a light poultice of bread and water applied. The following day the discharge was much more plentiful, and, from its character, was distinctly gonorrheal. I applied at once a solution of nitrate of silver, four grains to the ounce, and continued to do so daily, and sometimes twice daily. This discharge continued from the eyes with great virulence for about a month, and for some time there seemed to be no chance of preserving the sight. The pupil of either eye could only be seen by holding the eyelids forcibly

open, and sponging away the thick matter. After about a month it began again to abate, and on the 6th of December the eyes were quite well and healthy. The treatment employed throughout was the nitrate of silver solution, except once I tried sulphate of zinc with manifest disadvantage. It was also kept on weak syrup of bark the entire time.

On the 30th of October, two days after her confinement, the mother was seized with a very violent attack of acute rheumatism in the left instep, left wrist, and back of hand, and on the shoulder and muscles of the neck of the same side. She was put on a mixture of carbonate of magnesia and bicarbonate of potass, with tincture of hyosciamus, and occasionally, when pain was very violent, anodyne draughts. After a few days the pain and inflammation were entirely confined to the wrist and instep, being particularly seated in the ligaments and fibrous tissues of the back of the hand and dorsum of the foot. After a few days more it was entirely confined to the wrist and hand, and had left the foot. The joint was kept supported and bound up in cotton wadding, and constantly stuped with a decoction of poppy heads containing an ounce of carbonate of potass to the pint. On the 3rd of November her mistress's family physician (Dr. Little) saw her with me, as well as the child, and from our interrogations then we ascertained that she had had a profuse discharge for some time before her confinement; also, unusual swelling of the labia, enlargements in each groin, great pain passing water, and an almost impossibility of walking. Her husband now confessed to me what he had before denied—that he had had frequent intercourse with her between the time she came from the country and her confinement, and it was only after her confinement that he got quite well himself. The wrist and hand remained for a long time much affected. She was, shortly after Dr. Little saw her, put on bark and iodide of potassium by his advice, and kept on it for more than four weeks. She gradually but very slowly improved, and about six weeks after her labour was able to leave her bed and attend to herself.

Even now, at this date, there is considerable stiffness and contraction of the joint, and especially when she first begins to use it in the morning, but after stuping it in hot water, and after using a liniment composed of chloroform, camphorated oil and laudanum, it becomes less stiff and painful.

I entirely abstain from putting forward any theory upon the above case; but I think it is not devoid of interest, including, as it does, simple gonorrhea, gonorrheal rheumatism, and gonorrheal ophthalmia, in three different people, who, though distinctly different in person, were so intimately connected, both by position and circumstances, and, in this case, unfortunately, by disease. Another fact which, I consider, makes the case interesting is, that this rheumatism, occurring in the puerperal stage, was undoubtedly gonorrheal, and very tedious of cure.—*April* 11, 1868.

TRANSACTIONS OF THE COUNTY AND CITY OF CORK MEDICAL AND SURGICAL SOCIETY.[a]

SESSION 1867-68.

Dr. Johnston, *President*, in the Chair.

A Case of Paraplegia Successfully Treated by Ice to the Spine. By E. R. Townsend, jun., M.D., T.C.D., L.K. & Q.C.P.I. Read 12th February, 1868.

John N., aged thirty-two, a shopkeeper in Kanturk, was admitted into the South Infirmary and County Cork General Hospital, January 27th, 1866, under the care of Dr. E. R. Townsend.

History.—About five months before admission into hospital, having been engaged in hay-making under a very hot sun, and whilst perspiring freely, lay down to rest on the damp ground, and got chilled. Towards evening he got rigors, and suffered from pain in the back; a few days afterwards noticed that he had some weakness of the lower extremities. This became rapidly worse, until he became completely paraplegic. The pain in the back became very severe, being much increased by pressure over the sacrum; also had pain in the legs shooting upwards, increased by motion. For this he was leeched and blistered, without much benefit. He thinks he also got ergot of rye; but not feeling better, he came to Cork, and was admitted into hospital, January 27th, 1866.

Symptoms on Admission.—Complete paralysis of motion over lower half of the body; has full power over the bladder; urine acid and healthy in appearance; bowels confined, not acting without medicine; temperature of body normal, with a great tendency to perspiration. He says that at one time the pain in his back extended to the dorsal region, and that his arms were slightly paralysed. He also had great difficulty in swallowing. This he still occasionally suffers from, accompanied by a choking sensation in the throat. On applying a pair of compasses to the legs he cannot feel the points as two at a less distance than six inches apart; reflex motion much affected; feels tickling the sole of left foot more than that of the right; the toes of left foot move slightly under the stimulus; those of the right do not stir, though he feels a disagreeable sensation when tickled. He never had any sensation of formication in the legs, nor any sensation as if a cord were tied round his waist, and did not show any tendency to the formation of bed sores. From the history of this case, as well as from the symptoms which he presented on his admission into hospital, I came to the conclusion that it was one of inflammation of the membranes of the spinal cord, probably with exudation of lymph on

[a] These reports are supplied by Dr. Purcell, Secretary to the Society.

them, and that the cord itself was not engaged, and ventured to hope that the patient might ultimately recover some power over his lower extremities from the length of time (five months) that he had been paralysed. It was evident that the time for very active treatment had gone by, and that as the affection had become somewhat chronic, we could only expect any improvement to be very gradual. I commenced treating him January 27th, by giving every night a pill containing four grains of aloes and one of capsicum to regulate his bowels, which were very obstinately confined. As he complained of pain over the sacral region, I ordered six leeches to be applied, to be followed by the cupping glasses, and to take one ounce of the following mixture three times in the day :—

℞ Extracti ergotæ liquid. Ph. Brit., ℥ij.
Potassii. iodidi, ℥ijss.
Infusi gentianæ, ℥x.
Syrup. Simp., ℥ss.
Fiat mistura.

To have full diet and a bottle of porter every day.

January 29.—The leeching and cupping somewhat relieved the pain. To continue his mixture.

February 2.—To be dry cupped over the sacrum.

February 4.—Bowels were yesterday affected without the pill or other aperient medicine, being the first time for the last three months that they had acted without it; reflex action slightly improved.

February 6.—Tenderness still continues along the back, over the upper part of the sacrum. To be dry cupped every second day.

February 15.—Complains of feeling much stiffer in the morning, upon first getting out of bed, than when he has been up for some time; reflex action improved; feels tickling the soles more than at first; when in bed can now draw up his left leg so as to bend the knee, but cannot stretch it down again; to have a hot and cold douche along the spine night and morning.

February 19.—Bowels slightly confined; to take a dinner pill containing aloes; to be dry cupped again along the spine.

February 20.—Can bear pressure better along the spine; there is one spot still tender; complains of sore throat, and has some difficulty in swallowing; omit douche.

February 24.—To be dry cupped every day.

March 6.—To have a pill containing one quarter of a grain of extract of belladonna twice a day; to continue his mixture and the dry cupping.

March 8.—Electricity to be applied to the lower extremities every day, and along the spine, with the magnetic electric machine.

March 12.—Feels more power over his legs; can now draw up both legs slightly.

March 16.—Progressing favourably.

March 20.—To take half a grain of extract of belladonna in each pill, and to have a large belladonna plaster, spread on leather, applied along the spine. He can now draw up both legs in the bed, and can raise the left heel a little off the bed; reflex power improved, but still very deficient; but as he is gradually loosing his appetite, he thinks change of air to his own home for a while might serve him. He accordingly left the hospital on March 21st, promising to take his medicines regularly whilst at home, and to take car exercise every day.

August 15, 1866.—Patient was re-admitted. He states that he has steadily persevered with the above treatment. Since he left hospital has been constantly taking exercise on a car, taking long drives about the country; that he feels more power over his lower extremities, and that his bowels, which were constantly irregular whilst in hospital, are quite regular now, not requiring any aperient medicine; appetite good; also the pain in his head and back are much less.

Symptoms on Re-admission.—Nearly complete paralysis of motion in right leg, with atrophy of muscles of the calf; reflex action much impaired; two points of a pair of compasses cannot be felt as such in the longitudinal direction at a less distance than three inches; has a good deal of power in left leg, being able to raise it about a foot and a half off the bed. When lying down he feels two points as two at a distance of one inch; urine acid; appetite indifferent; has very slight pain and tenderness on strong pressure over lumbar and sacral regions, and particularly at a point corresponding to the fourth lumbar vertebra; has some dysphagia occasionally, having now taken ergot and iodide of potassium steadily for nearly seven months, and having improved up to a certain point, where he remained stationary, I concluded that the chronic meningitis had been subdued, but that the nerves, having been so long pressed on in the narrow canals by which they pass out of the spinal cavity, were in the same state as the nerves in the axillary plexus in cases of long continued pressure against a chair, which we sometimes see giving rise to a local form of paralysis of the arm without actual nervous lesion, and which requires a powerful stimulus to the nervous centres to enable them to pass a current of nervous influence through the nerves so pressed on. I therefore determined to try the alternate effects of heat and cold applied along the spine by means of ice, and hot water as recommended by Dr. Chapman, for the purpose of increasing the vitality of the spinal cord. Accordingly, on August 17th, I ordered that pounded ice, mixed with common salt, should be applied along the spine for half an hour in one of Chapman's spinal ice bags, and on this being removed, that the hot water bag be applied for same space of time.

August 18.—Ice and hot water to be applied for three quarters of an hour, as he felt no inconvenience from the first application.

August 19.—Ice and hot water bag for one hour.

August 21.—This was increased to one hour and a half.

August 22.—Ice to be applied for two hours; hot water bag for one hour; electricity to be applied every day; to take half a teaspoonful of tinctura quina aurantii three times in the day in water, as his appetite was failing.

August 24.—States that he feels much more power over his lower extremities, and his appetite is improving.

August 25.—Ice could not be procured to-day, so I applied Richardson's ether spray along the spine for fifteen minutes, followed by the hot water bag, to be applied for an hour.

August 26.—Patient states that the ether-spray did not produce a greater degree of cold than the ice-bag, and found himself in no way better after its use. Whilst using it I found the back quite as sensitive to pressure over the tender part of the spine as previously.

August 27.—Ice and hot-water to be used as before; he continued this plan of treatment steadily, gradually increasing the time of application of the ice-bag until he could easily bear it on for three hours, and says he could bear it for five or six if necessary. He has been constantly improving since August 17th, when he first commenced the ice treatment.

September 10.—Improving very much the last few days, being now able to stand, for about 30 seconds, on both legs without assistance; the right leg is stronger in a marked degree, the patient being now able, as he lays in bed, to raise the entire limb fully two feet off the bed; can stir the toes quite well of the left, but not of the right foot—yet, does not complain nearly so much of the tenderness on pressure over the back.

September 17.—Patient is able to stand for nearly two minutes; marked improvement in all other symptoms.

September 24.—Exercises himself, supported between two men, and walks nearly half the length of the long ward without stopping. On first standing up feels pain and stiffness in the back, which gradually wears off as he walks; he perspires freely from the exertion.

September 30.—Complains of dull pain over the kidneys, and a burning sensation in passing urine, which is rather high coloured, but of normal reaction; ordered to drink kali-water, and to be dry cupped over the loins.

October 9.—Pain in kidneys relieved; has no pain in passing water, which is acid; to resume his ice and hot-water treatment.

October 14.—Patient is now able to walk the entire length (140 feet) of the ward with crutches, without any assistance; he raises the left leg with perfect ease and lays it firmly on the ground, but has a slight drag in the right; he spends his day exercising himself about the ward.

October 21.—Is now able to lay the right leg more firmly on the ground, and can now walk with the aid of two sticks; the reflex action

which was almost lost in right leg is now nearly perfect, the limb jerking about when the sole is tickled, and the toes sensitive to the least touch.

November 5.—He is now able to walk for a short distance without sticks, but his feet come to the ground with a spasmodic jerk.

November 15.—Is able to walk much more firmly without sticks, but says it requires great exertion on his part, his back feels so weak, though the tenderness and pain on pressure has almost disappeared.

December 21.—Ice to be discontinued; he is so much better.

January 2.—Left the hospital of his own accord, feeling almost well, and wishing to resume his business which he had been unable to attend to for a year and a half. Exact state on leaving hospital, is able to walk a hundred yards without sticks; on placing the right leg on a chair he is able to support the weight of his body on the left, but cannot do the same with the right leg yet, he can walk very well with a stick. This man called at my house last August to let me see the improvement in his state. He says he can walk several miles without fatigue, and has no jerk or drag in his gait, but cannot walk very fast; he can stand on either foot and raise the other without support; he can stand any length of time by having one hand or even one finger resting against some fixed support, such as a table or the counter of his shop, but would totter if not touching something when standing still; he can ride nearly as well as ever; his muscles are firm and well nourished, the right calf, which had been so wasted, is as plump and firm as it ever was, and his weight is the same as before his illness.

The improvement in this case was very gradual, and from the day he began to amend, it went on steadily. From the first this man was taken out of bed every day, and his position changed as often as possible, to lessen spinal congestion, and also to relieve the back from pressure, and thereby prevent stripping. From the day the ice treatment was adopted he began to improve, and during the entire time, over four months, that he was using it he took no medicine, except a little tincture of quinine to give him an appetite. That the favourable result of this case was due to the effects of the ice treatment, I think admits of no doubt.

Dr. Chapman, in speaking of this plan of controlling the circulation, and acting thereby on the sympathetic and cerebro-spinal systems, says: "I have discovered that a controlling power over the circulation of the blood in the brain, in the spinal cord, in the ganglia of the sympathetic nervous system, and through the agency of these nervous centres, also in every other organ of the body can be exercised by means of cold and heat applied to different parts of the back. In this manner the reflex excitability or excito-motor power of the spinal cord, and the contractile force of the arteries in all parts of the body can be immediately modified. In order to lessen the excito-motor power of the spinal cord only, he applies ice in an India-rubber bag along that part of the spinal column

containing the part of the cord which he wishes to act on. On the same principle, he says, the vitality of the spinal cord may be increased by applying hot-water and ice alternately if very energetic action be required; if less vigorous action be required, ice or iced-water only should be used, it may be repeated several times a day, with a long interval between each application, he then continues:—"If it be desirable to increase the circulation in any given part of the body, this I have found myself able to effect by exerting a soothing, sedative, depressing or paralysing influence (according to the amount of power required), over those ganglia of the sympathetic which send vaso-motor nerves to the part intended to be acted on. This influence may be exerted by applying ice to the central part of of the back, over a width of from four to four and a-half inches, and extending longitudinally over the particular segments of the sympathetic and of the spinal cord on which it is desired to act."

He also states that by applying ice to the back of the neck and between the scapulæ, he can direct a flow of blood to the brain; that the circulation in the thoracic and abdominal viscera can be influenced in like manner by applications to the dorsal and lumbar regions, &c. Now without going quite so far as this with Dr. Chapman, in his ideas of the effects of his discovery, as he terms it, I must say that I quite agree with him in considering it a valuable therapeutical agent, and one of great power when applied to suitable cases; and I certainly think that it is deserving of more extended trial, particularly in hospital practice, where the exact results can be more satisfactorily arrived at, than in private practice. I have several times applied ice followed by hot poultices to the nates and sacrum to prevent the formation of bed-sores, as recommended by Brown-Séquard, on much the same principles, and with very satisfactory results. I believe the application if resorted to in time, and before the skin is actually broken, will be found in almost all cases of paralysis, to prevent the formation of bed-sores; but this case is the first in which I have applied the ice-bag to the spine itself.

Selections from the Dutch Archives of Medical and Physical Science, Vol. iii., Parts I. and II. "Nederlandsch voor Archief Genees en Natuurkunde," Deel iii., 1e en 2e Afleveringen, Utrecht, 1867. Translated by William Daniel Moore, M.D., Dub. et Cantab., M.R.I.A., L.K.Q.C.P.I., Honorary Fellow of the Swedish Society of Physicians, of the Norwegian Medical Society, and of the Royal Medical Society of Copenhagen; Secretary for Sweden, Norway and Denmark, to the Epidemiological Society of London.

1.—*A Contribution to the Pathological Histology of Affections of the Intestinal Canal in the so-called Cattle Plague*, by A. Wirtz, Lecturer at

the Royal Veterinary School. In the course of last year Professor Koster applied to me for information on some points relating to the pathological anatomy of the then prevailing cattle plague, and for objects for particular investigation, especially parts of the intestinal canal. Our intention was to enter upon a more extensive histological examination. From various circumstances, chiefly connected with official duties, our intention was carried out only to a very limited extent. The literary and historical facts which I had already collected are little adapted for communication in this journal, but I thought it might be interesting to say a few words upon a single point: the histogenesis of the processes in the Peyerian and solitary follicles, according to the results of the investigation carried on in the anatomical museum here. For this opinion I had two reasons. 1. The fact that two authorities on the subject of veterinary pathology—Brauell[a] and Ravitsch[b]—differ entirely in opinion on this point. 2. The question whether the nature of the intestinal affection in the typhus of man does or does not agree with that in the cattle plague.

Brauell thinks that the local process in the intestinal mucous membrane consists chiefly, in addition to fatty degeneration and exfoliation of the epithelium, in a new formation, increase of the cellular layer of the mucous glands, the product of which also passes more or less rapidly into fatty metamorphosis. Meanwhile this is, however, also discharged from the glandular openings, and then forms on the surface of the mucous membrane, the, in proportion to the progress of the degenerative process, softer and softer matter, which is so often incorrectly described as exudation.

Ravitsch, on the other hand, infers, from extensive investigation that the mucous glands are not the principal seat of the disturbances. He points especially to the connective (follicular and adenoid) tissue of the mucous membrane as the starting-point of the changes. These consist in a proliferation of the corpuscles of connective tissue, and a more or less abundant production of small, round, lymphoid cells in the follicles of the intestinal wall, the mucous tissue surrounding the follicles, and in great part, also, in the sub-mucous connective tissue. The newly-formed elements break up more or less rapidly into a state of molecular detritus, with which a destruction of the mucous tissue is combined. This degeneration, both of the tissue elements and of the cells, occurs earlier and more extensively in proportion as the latter are accumulated in greater quantity, so that these are found also in extraordinary abundance in the places where loss of substance is already perceptible.

[a] *Neue Untersuchungen, betreffend die pathologische Anatomie der Rinderpest.* Dorpat, 1862.

[b] *Magazin für die gesammte Thierheilkunde* von Gurlt Hermy, Berlin, 1864, 30ter Band, 3ter Heft, pp. 313-56.

The Peyerian and solitary glands are, in the commencement of the disease, always swollen, and loaded with lymph cells, with which the interfollicular tissue also is so infiltrated that it can be recognized only by its fibrous fasciculi. Moreover, there exists everywhere a very intense proliferation of the connective tissue corpuscles, particularly evident in the sub-mucous membrane, and between the glands of Lieberkühn. At a later period of the disease the follicles are in great part, especially in their centre, filled with yellow molecular mass, and burst in their arched portion. The contents which have partly escaped then form larger or smaller, firm or partly softened yellowish white laminæ of varying thickness. Some follicles are also of a deep red colour, and are covered with extravasations or dark red crusts. The degeneration of the follicular tissue spreads, moreover, towards the circumference, so that after removal of the lamina or crusts, the areolated gland remains with rough, corroded follicular walls, or, more rarely, with great loss of substance in the form of ulcers. The affection of the tubular glands is secondary, and proportionate to the intensity of the process described; the glands are either still present, or, in consequence of the alterations in the surrounding tissue, are more or less destroyed, and are finally wholly changed into a molecular mass.

The microscopical examination, in the anatomical museum here, of solitary and Peyerian glands, where the process had just begun, entirely confirmed the correctness of Ravitsch's views. Swollen parts were met with where the mucous membrane still completely traversed the surface, and distinctly exhibited the as yet unaltered glands of Lieberkühn; while beneath the same, and between the bases of the glands, a swollen mass of connective tissue, infiltrated with lymphoid cells (adenoid tissue), was found. If the process be somewhat farther advanced, so that in the centre of the augmented mass the first traces of destruction and formation of detritus are apparent, the mucous membrane, also, is abnormal, scarcely exhibiting the glandular layer, and is soon drawn into the process of infiltration and destruction, so that either an opening occurs through which the mass of detritus is discharged from beneath, or larger pieces of the mucous membrane are thrown off as a dead mass with the subjacent layer.

In a histologico-pathological point of view we might, therefore, place the intestinal affections in the so-called cattle plague, and in the typhus of man in one line. It would, however, be at least very venturesome, merely on the ground of this analogy, to express a positive opinion with respect to them.

II.—*Fibroma at the Base of the Brain and along the roots of some Cerebral Nerves*, by W. Koster. In the middle of the month of August, 1867, I made in the hospital here the *post mortem* examination of a strongly-

built and powerfully muscular man, aged thirty-three, in whom, during life, the symptoms of a tumour in the brain were observed. Neither these symptoms, nor the history of the case in general, require any detailed description, as they presented no peculiarities worth mentioning. It is necessary to state only that during the last two months of the affection the man began to be deaf. The deafness increased so much that it was soon complete. This was a strong confirmation of the diagnosis which had already been made that the seat of the tumour was the posterior part of the base of the brain. There was no disturbance of vision. Occasionally the occurrence of cerebral hyperemia threatened to cause death, which finally took place without perceptible signs of paralysis of the medulla oblongata.

In the body no morbid changes were met with, except within the skull. Sanguineous congestion of the large and small vessels, dropsical distention of all the ventricles, especially of the third, and a considerable tumour at the under surface and anterior edge of the cerebellum, at once struck the eye. It is in fact the nature and extent of this tumour, which seemed to me to be deserving of a short communication. The tumour consisted, like the cerebellum, of two lateral portions, connected in the middle by a transverse piece, in front of the pons varolii. The swelling was greater on the left side, and projected in front of and above the hemisphere of the cerebellum of that side, forming, as it were, a second and smaller hemisphere. It was, however, firmly connected with the cerebral mass, as the whole tumour, having arisen beneath, *or, at least in*, the pia mater, had penetrated also, though not deeply, into the mass of the cerebellum. On the right the tumour projected less, formed, as it were, the anterior and inferior surface of the hemisphere of the cerebellum itself, the substance of which, as well as on the other side, was partially involved in the tumour. These particulars were of course not visible until the tentorium cerebelli had been removed. The centre piece of the tumour lay flat in front of the pons Varolii, and extended only along the clivus Blumenbachii, through the great opening of the tentorium, forwards to the tuber cinereum. The surface of the clivus (basilar process), and the dorsum ephipphii (sella turcica), were excavated by the pressure of the tumour, while, at the same time the cavity for the pituitary gland was thereby diminished, and the latter was itself atrophied. Posteriorly the lateral portions of the tumour had rounded edges, which lay on the depressions of the occipital bone, and had there produced some further excavation, and wear and tear of the bone. Anteriorly appendices of the tumour were continued along the origins of some nerves, especially along the nervus trigeminus, and along the auditory and facial nerves in the meatus auditorius internus. The nervus vagus and the glosso-pharyngeal were only pushed aside. On taking out the brain, when the tumour along the basilar process came into view, the

abducent nerve did not appear. Nor, after taking out the brain, could I recognize the origin of the nerve, as the middle piece of the tumour lay firmly pressed against the anterior part of the pons Varolii. I suspect that the nerve lay pushed forwards and upwards.

The tumour formed within the distended meatus auditorius internus a mass rounded at its extremity, whose surface was seen in the skull after the cavity of the tympanum was opened, so that the vestibule was quite pushed away. I should have been glad to have delineated more accurately the change of form of the other parts of the skull (a drawing of the tumour is given in the original), but the *post mortem* examination was made in secret, and the chiselled out petrous bone was all that I could obtain, and that not without difficulty. A more accurate investigation, *in situ*, of the continuation of the tumour along the nervus trigeminus and the Gasserian ganglion especially would have been of importance. The dura mater, which covers the so-called Meckel's cavity, was separated, and the pushed out and scarcely recognizable mass of the nerve and of the ganglion was contained in the increasing tumour, which was demonstrable as far as the superior orbital fissure.

When I began the closer examination of the parts of the tumour taken out, I thought I should again find a sarcoma, such as so often occurs in the cavity of the skull, and has formerly (*Nederlandsch Archief*, Deel i., p. 429), and subsequently repeatedly been observed by me. However, the knobby state of the surface, and the hardness of the tumour on the left side, had already attracted my attention. It seemed to me, on microscopical examination, that the tumour must be looked upon as a fibroid, or, rather (on account of its growth and extension), as a diffuse fibroma. The most freely projecting left part had quite the appearance, on section too, of one of those small fibrous tumours which are so frequently met with in the uterus. The softer parts of the tumour consisted, also, entirely of fibrous connective tissue, but with a considerable number of blood-vessels. On examining the parts of the tumour which had grown along the origins of the nerves, nerve tissue was, as might be expected, met with.

Only in some parts of the tumour was a tendency to cell formation visible. Thus, in place of the round or slightly elongated nuclei of the connective tissue, groups of large irregularly situated cells were seen, but so scattered and so little characteristic were these that I would not venture to call the tumour fibrous carcinoma.

Besides its situation and extent, the tumour is consequently distinguished also decidedly by its composition. Essentially fibrous formations are rare in the cerebral membranes and brain. Besides some cases scattered in literature, Förster mentions an observation of Rokitansky concerning a cavernous tumour of the pia mater, and a case by Thilenius:—"A fibroid of the size of a hen's egg in the pia mater; the

tumour was externally tuberculated and internally uniformly fibrous" (Förster, Handbuch, i., p. 604.)

While the cerebral tumours, particularly accurately studied by Virchow as sarcoma fusocellulare and gliosarcoma, form a peculiar group of neoplasmata of the nervous centres, in contrast to the fibromata (neuromata) of the peripheral nervous system, tumours such as that above described make the transition, so far as concerns their seat, evident. In this point of view, and in connexion with the increase of the fibroma described by me along the trigeminus and the auditory nerve, the words of Förster are remarkable:—"The neuromata occur mostly on the peripheral trunks of the spinal nerves, sometimes, also, on the cerebral nerves, *particularly on the auditory*."

III.—*A Salivary Calculus in the Whartonian Duct*, by A. Ilcken. In No. 54, 1866, of the *Wiener Wochenschrift*, the case is described as being remarkable, of a salivary calculus removed on the 20th February of that year, in the "Hôpital Lourcine," at Paris, from the Whartonian duct of a woman aged twenty-four. The greatest measurement of the calculus amounted to 1 centimetre.

From this communication I infer that the salivary calculus taken by me from the Whartonian duct, is still more remarkable than I at first thought. In fact, this calculus is $3\frac{1}{2}$ centimetres (1·3779″) in length and 1 centimetre in breadth. It weighs now, on the 2nd October, after having been freed from the adhering mucus and well dried, 2 scruples 1 grain.

The patient, a lady of seventy years, had only a short time before observed that there was something not right in her mouth. Her chief complaint was of the saltish taste of a fluid which bubbled up beneath her tongue. On the 13th of June she came to me. I found the whole right half of the floor of her mouth hard, and this hardness was perceptible, also, externally, on pressure behind the angle of the lower jaw. Close to the frenulum linguæ, on the right side, was an opening, the dilated orifice of the Whartonian duct, whence, on pressure on the floor of the mouth at that side, a yellowish thin fluid was discharged, which produced the saltish taste. A probe introduced into this opening immediately struck against a hard body. I dilated the opening with a button-pointed bistoury, and could then also see the point of the calculus, but my efforts at extraction were in vain. On the following visit, too, a couple of days later, I was obliged, after having divided the soft parts on the calculus with a strong Cooper's scissors to a tolerably great extent, to desist from the removal of the stone, chiefly on account of rather violent hemorrhage. On my third visit, however, after the lapse of two days more, the calculus came out with tolerable ease at the first pull.

It has the form of the Whartonian duct, and is, therefore, slightly curved. The part which was turned towards the frenulum is the thickest. The surface is rough, with the exception of a small portion at the outer end. In order to preserve it uninjured I have abstained from having it chemically examined. Such an examination would certainly have yielded no other result than that of other salivary calculi and of the calcareous salts, which, in some people, become deposited on the teeth (tartar). The patient is toothless, and had formerly a quantity of tartar on the teeth. The laminated structure of the calculus is visible at the inner extremity, from which, in the efforts at extraction with the forceps, pieces are chipped off.

A few days after the removal of the calculus this lady no longer found anything wrong with her mouth. The inflammatory hardness in the neighbourhood of the Whartonian duct and in the sub-maxillary gland speedily gave way.

IV.—*Fracture of the Os Calcis from strong contraction of the muscles of the calf of the leg*, by Dr. van der Lee, of Velp. The following history relates, in my opinion, to a surgical lesion too rare not to deserve a word of mention:—

On the evening of the 24th October, 1866, I was called to a woman aged sixty, who, having walked the short distance from Velp to Arnhem, in the latter place, going down a step, came with the left foot across the channel, and, at the same time, losing her balance, fell down. She attempted to get up, but found that she could not stand upon the left foot, and that the latter was very painful. A surgeon was called, who was obliged to cut off her shoe and stocking, and after applying a simple bandage, at her own request had her brought home.

On removing the bandage, no unusual condition of the leg and foot was observed. The patient complained of pain above the heel and in the ankle. In the former situation the following was observed:—About two fingers' breadth above the os calcis was a hard crescentic mass, which appeared to have been separated from the os calcis; the skin between this mass and the heelbone was drawn inwards, the epidermis in the place where the skin was strongly stretched by the same mass, was raised by effusions of blood, and was very painful.

All movements of the foot were possible when the leg was fixed in the usual mode, and the foot was moved with the other hand; there was, consequently, no luxation. Fracture, in the ordinary sense, was not demonstrable, as both the position of the foot was natural, and crepitation was entirely absent.

From all this we diagnosed: rupture of the tendo Achillis, with a piece of the os calcis attached.

The prognosis was so far unfavourable that complete union would be extremely doubtful, while the treatment must be directed to the object of

promoting union as far as possible. A firm bandage was, therefore, the first indication.

It appeared not advisable to apply a starch bandage on the first evening, as we feared that the skin could not bear the strong pressure. We determined, therefore, to apply a simple bandage, and to have it covered with compresses of cold water. On the following day the swelling was not diminished, nor did we even then think it well to use the starch bandage, as this would hinder us from observing the state of the skin, as often as might be necessary.

Union would be possible only if the os calcis were brought as close as might be to the extremity of the tendon; relaxation of the muscles of the calf was to this end as necessary as a good position of the foot. To effect all this we had an apparatus made consisting of three parts connected one to another by hinges.

We bound the lower leg and foot from above downwards in order to bring the tendon as much as possible towards the os calcis, and we placed the whole leg in the apparatus described in the position indicated in the figure. The under surface of the knee rests upon α, while β is made as obtuse as possible, whereby the heel is brought backwards and upwards, and the toes downwards.

The course and treatment of the case were in other respects tolerably simple. From time to time we renewed the bandage, and at length we thought we might try how far the patient had regained the use of her foot. In the beginning of January, 1867, she was so much improved as to be able to stand upon the left leg, though the support of a stick was indispensable to her. Between the os calcis and the tendon some intervening matter (ligamentous mass) had formed, which made it possible to bring the heelbone upwards, although this movement was not free. The hard mass was still plainly to be felt.

I refrain from further remarks upon this case, which I communicate only on account of the comparative rarity of the lesion. Although practitioners seem sometimes to have felt themselves called upon to adopt more energetic modes of treatment (Poncelet cut the tendo Achilles in order to approximate the pieces of the os calcis [a]), this case proves that good results may be obtained by ordinary simple management. As to the origin of the lesion I imagine that two causes have co-operated:—1. A force from without acting on the fragile bone (the woman was sixty years of age); and 2. The strong contraction of the muscles of the calf which takes place when a false step is made, and which, no doubt, must have been the principal element in the accident.

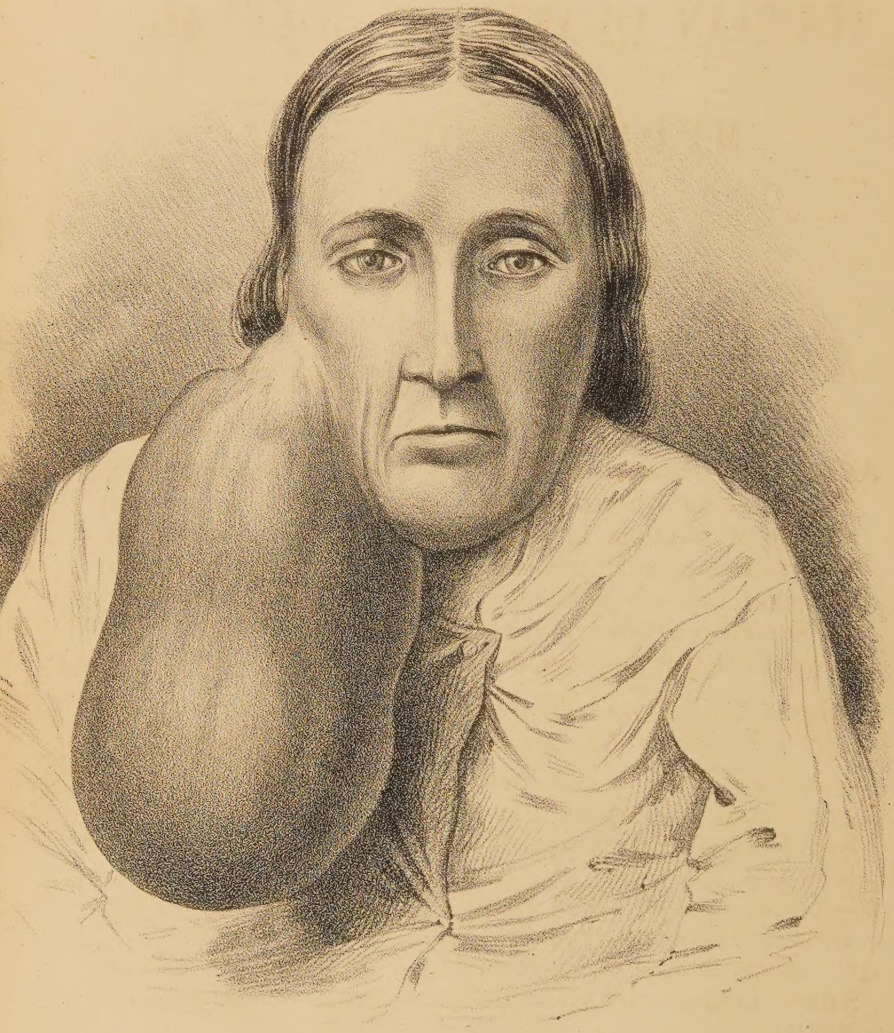
V.—*Origin of the Congenital Renal Cystoid*, by W. Koster. In the preceding volume of the *Nederlandsch Archief* I published an essay upon

[a] Emmert, Heelkunde, vert. door Polano D. iv., Afl. 3, blz. 232.

"Uric Acid Infarction and Renal Cystoid." On account of the difficulties there specified (pp. 179, *et seq.*) I thought that Virchow's opinion, that the congenital renal cystoid owed its origin to a "fetal inflammation of the renal papillæ," must be considered incorrect, and I gave another view of the course of such cases. It was to the effect, that the origin of the cystoid kidney was deduced from an *abnormal development*, a lesion of evolution, analogous to atresia ani, non-development of the urethra, abnormal development of the spinal canal, causing hydrocephalus, spina bifida, &c.

Although this view does not at once throw much more light upon the details of the development of the renal cystoid, it differs widely from Virchow's opinion; and it brings us a step nearer the truth if actual proofs of its correctness are discoverable. As such I could formerly mention only: the total absence of the renal calyces, the renal pelvis, and the ureters in many cases of congenital renal cystoid, and the want of special arguments in favour of the existence of fetal inflammation of the renal papillæ. This last is rather assumed as a postulate of the theory, which looks upon the renal cysts as "retention-cysts," than proved by facts.

The way to arrive at greater certainty lay evidently in the investigation of the development of the kidneys in the embryo. It is notorious that our knowledge of the details thereof is still very defective, and that the investigation is attended with extraordinary difficulty. While I was lately engaged with Heer J. G. van der Lith in researches upon the development of some parts of the internal genitals, with special reference to the descent of the testicles, upon which subject something will soon be published, I was anxious, also, to study the development of the kidneys. Meanwhile, Kupfer's essay on the development of the kidneys appeared in the "Archiv für mikroskopische Anatomie von Max Schultze, Bd. 1, Heft 2 und 3." From this it appeared that the *kidney proper*—that is, the blastema for the tubuli uriniferi—is developed by itself, independently of the evolution of the Wolffian duct, which becomes ureter and renal pelvis. If this fact be confirmed, the origin of cystoid kidneys is explained together with *total absence of renal pelvis and ureters*, while it would be incomprehensible if the renal tubes were formed as out-runners of the renal pelvis. Want of time and material prevented me from repeating and extending Kupfer's important investigation. I therefore thought that I might call attention to the applicability of the fact ascertained by K. to my views as to the origin of the cystoid kidneys. The question of the *how* of the abnormal development is not yet thus answered, it is only made evident *that* an abnormal development may occur, which places the kidney in process of formation under totally different conditions from those existing in ordinary cases, where there is connexion between it and the renal pelvis. Evidently an entirely different process takes place from that understood by *inflammation* of formed renal papillæ.



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